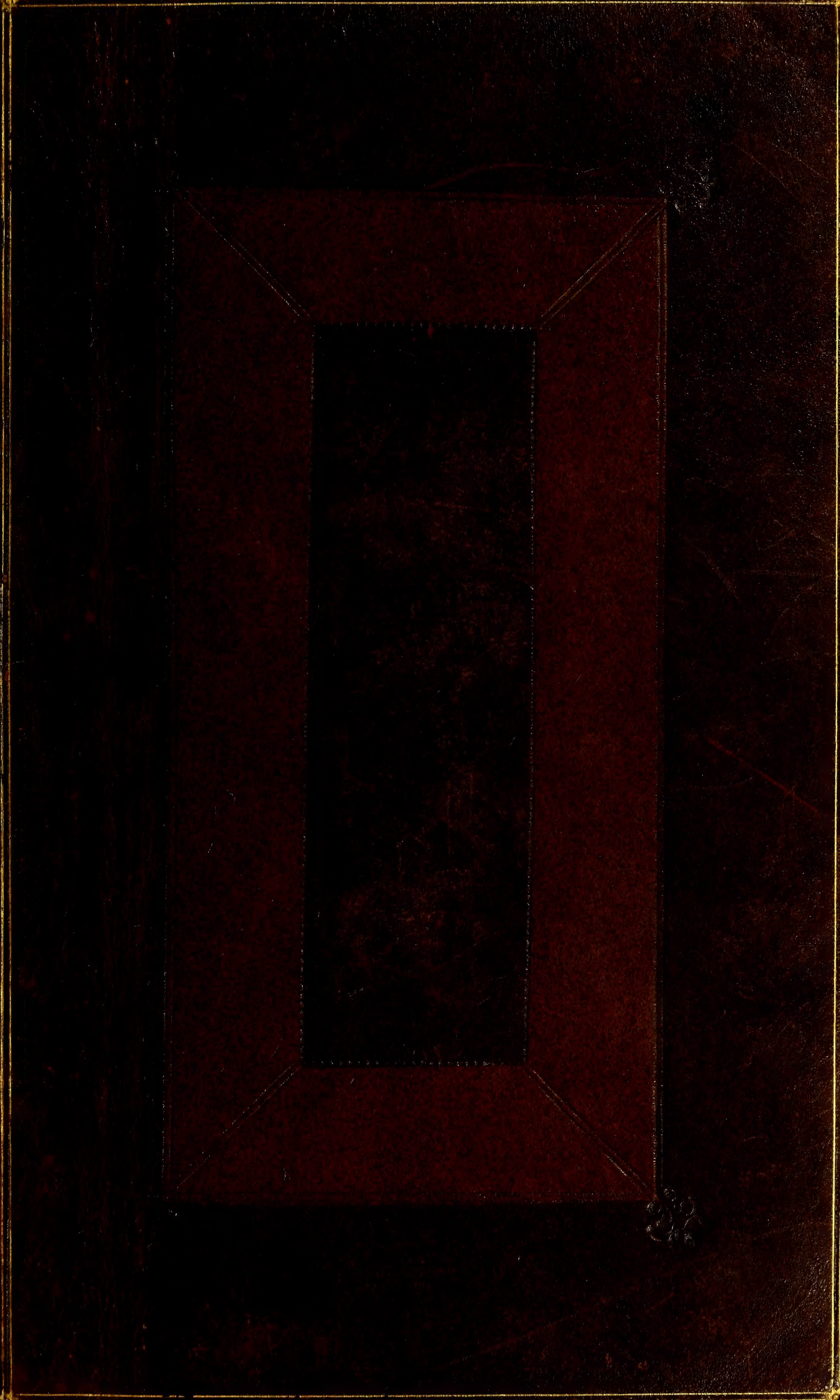


T. Hepworth Hall.

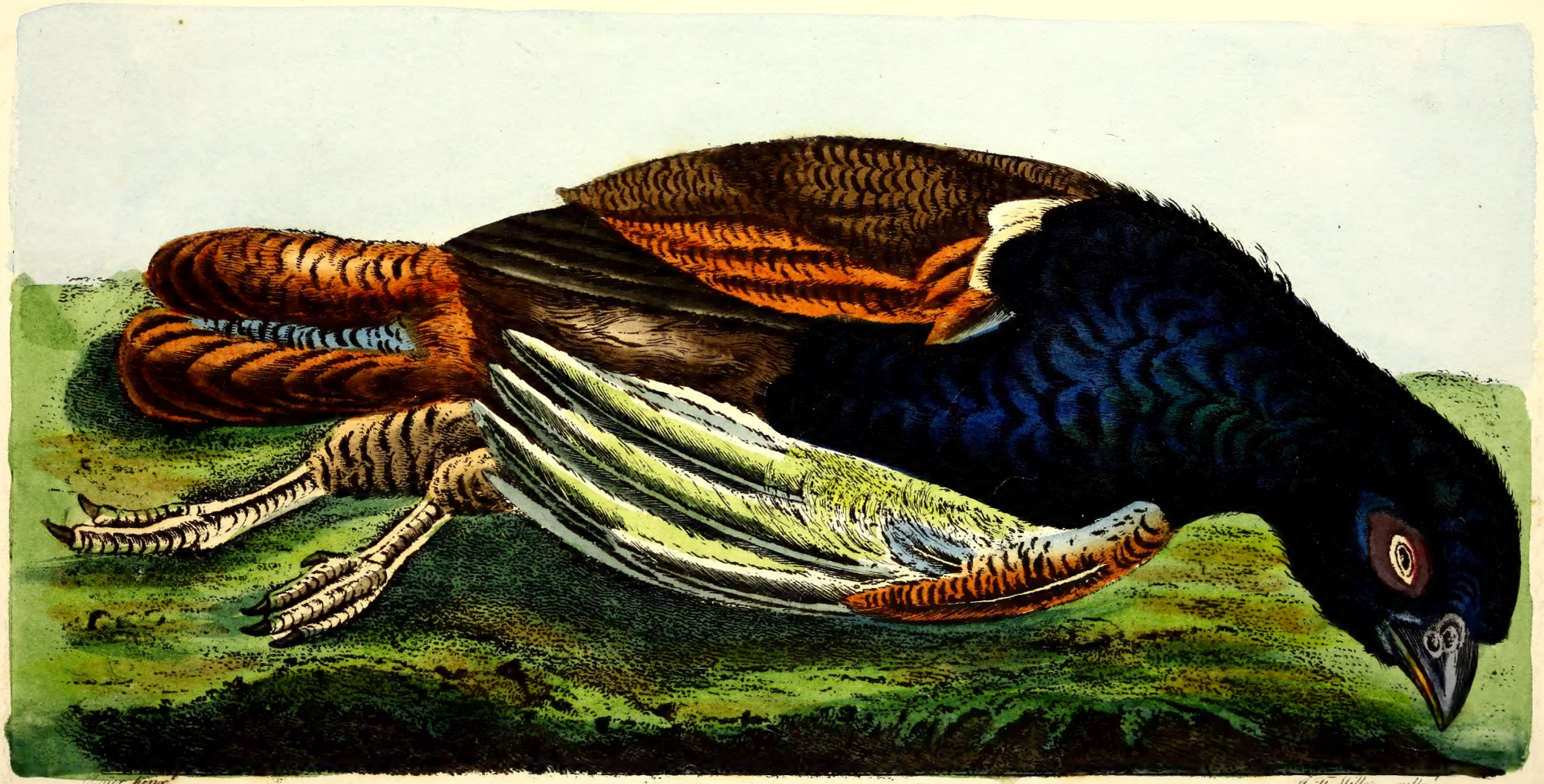
THE

NATURAL HISTORY

OF

SELBORNE,

&c. &c.



A HYBRID BIRD.

THE

NATURAL HISTORY

OF

SELBORNE,

BY THE LATE

Rev. GILBERT WHITE, A. M.

FELLOW OF ORIEL COLLEGE, OXFORD.

TO WHICH ARE ADDED,

THE NATURALIST'S CALENDAR,

MISCELLANEOUS OBSERVATIONS,

AND POEMS.

A NEW EDITION, WITH ENGRAVINGS.

IN TWO VOLUMES.

VOL. I.

LONDON:

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1825.

T. C. HANSARD,
Pater-noster-row Press.

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ADVERTISEMENT.

THE favourable reception with which the works on Natural History of my late respected relation, the Rev. Gilbert White, of Selborne, have been honoured, by the persons best qualified to judge of their merit, has induced me to wish to present them to the public in a collected and commodious form, free from the incumbrance of any extraneous matter. His largest work, entitled *The Natural History of Selborne*, has probably been supposed by many to be formed upon a more local and confined plan than it really is. In fact, the greater part of the observations are applicable to all that portion of the island in which he resided, and were, indeed, made in various places. Almost the only matter absolutely local is the account of the antiquities of the village of Selborne; and this seemed to stand so much apart, that, however well cal-

culated to gratify the lovers of topographical studies, it was thought that its entire omission would be no loss to the work, considered as a publication in Natural History. Its place is occupied by the *Naturalist's Calendar and Miscellaneous Observations*, which appeared in a separate volume since the Author's decease, extracted from his papers by Dr. Aikin. That gentleman has likewise made some farther selections from the papers, which are now all in my possession; and has undertaken the revision and arrangement of the whole. A very valuable addition to the Calendar and Observations has been obtained from the kindness of William Markwick, Esq. F.L.S. well known as an accurate observer of nature; whose parallel calendar, kept in the county of Sussex, is given upon the opposite columns.

The Editor flatters himself, that the publication in its present form will prove an acceptable addition to the library of the naturalist; and will, in

particular, be useful in inspiring young persons, and those who pass their time in retirement, with a taste for the very pleasing branch of knowledge on which it treats.

The following few biographical records of the author, it is presumed, will not be unacceptable to the reader.

GILBERT WHITE was the eldest son of John White, of Selborne, Esq. and of Anne the daughter of Thomas Holt, rector of Streatham in Surrey. He was born at Selborne on July 18, 1720; and received his school-education at Basingstoke, under the Rev. Thomas Warton, vicar of that place, and father of those two distinguished literary characters, Dr. Joseph Warton, master of Winchester school, and Mr. Thomas Warton, poetry-professor at Oxford. He was admitted at Oriel College, Oxford, in December 1739, and took his degree of bachelor of arts in June 1743. In March 1744 he was elected fellow of his college. He became master of arts

in October 1746, and was admitted one of the senior proctors of the university in April 1752. Being of an unambitious temper, and strongly attached to the charms of rural scenery, he early fixed his residence in his native village, where he spent the greater part of his life in literary occupations, and especially in the study of nature. This he followed with patient assiduity, and a mind ever open to the lessons of piety and benevolence which such a study is so well calculated to afford. Though several occasions offered of settling upon a college living, he could never persuade himself to quit the beloved spot, which was, indeed, a peculiarly happy situation for an observer. He was much esteemed by a select society of intelligent and worthy friends, to whom he paid occasional visits. Thus his days passed, tranquil and serene, with scarcely any other vicissitudes than those of the seasons, till they closed at a mature age on June 26, 1793.

Fleet Street,
1802.

J. W.

THE

NATURAL HISTORY

OF

SELBORNE

LETTER I.

TO THOMAS PENNANT, ESQUIRE.

THE parish of SELBORNE lies in the extreme eastern corner of the county of *Hampshire*, bordering on the county of *Sussex*, and not far from the county of *Surrey*; is about fifty miles south-west of *London*, in latitude 51, and near midway between the towns of *Alton* and *Petersfield*. Being very large and extensive, it abuts on twelve parishes, two of which are in *Sussex*, viz. *Trotton* and *Rogate*,

If you begin from the south and proceed westward the adjacent parishes are *Emshot*, *Newton*, *Valence*, *Faringdon*, *Harteley*, *Mauduit*, *Great Wardleham*, *Kingsley*, *Hadleigh*, *Bramshot*, *Trotton*, *Rogate*, *Lysse*, and *Greatham*. The soils of this district are almost as various and diversified as the views and aspects. The high part to the south-west consists of a vast hill of chalk, rising three hundred feet above the village; and is divided into a sheep down, the high wood, and a long hanging wood called *The Hanger*. The covert of this eminence is altogether beech, the most lovely of all forest trees, whether we consider its smooth rind or bark, its glossy foliage, or graceful pendulous boughs. The down or sheep-walk, is a pleasing park-like spot, of about one mile by half that space, jutting out on the verge of the hill-country, where it begins to break down into the plains, and commanding a very engaging view, being an assemblage of hill, dale,

DSI

woodlands, heath, and water. The prospect is bounded to the south-east and east by the vast range of mountains called *The Sussex Downs*, by *Guild-down* near *Guilford*, and by the *Downs* round *Dorking*, and *Ryegate* in *Surrey*, to the north-east, which altogether, with the country beyond *Alton*, and *Farnham*, form a noble and extensive outline.

At the foot of this hill, one stage or step from the uplands, lies the village, which consists of one single straggling street, three quarters of a mile in length, in a sheltered vale, and running parallel with *The Hanger*. The houses are divided from the hill by a vein of stiff clay (good wheat-land), yet stand on a rock of white stone, little in appearance removed from chalk; but seems so far from being calcareous, that it endures extreme heat. Yet that the freestone still preserves somewhat that is analogous to chalk, is plain from the beeches, which

descend as low as those rocks extend, and no farther, and thrive as well on them, where the ground is steep, as on the chalks.

The cart-way of the village divides, in a remarkable manner, two very incongruous soils. To the south-west is a rank clay, that requires the labour of years to render it mellow; while the gardens to the north-east, and small inclosures behind, consist of a warm, forward, crumbling mould, called *black malm*, which seems highly saturated with vegetable and animal manure; and these may perhaps have been the original site of the town; while the woods and coverts might extend down to the opposite bank.

At each end of the village, which runs from south-east to north-west, arises a small rivulet; that at the north-west end frequently fails; but the other is a fine perennial spring, little influenced by drought or wet seasons, called *Well-*

*head.** This breaks out of some high grounds joining to *Nore Hill*, a noble chalk promontory, remarkable for sending forth two streams into two different seas. The one to the south becomes a branch of the *Arun*, running to *Arundel*, and so falling into the *British* channel: the other to the north. The *Selborne* stream makes one branch of the *Wey*; and, meeting the *Black down* stream at *Hedleigh*, and the *Alton* and *Farnham* stream at *Tilford-bridge*, swells into a considerable river, navigable at *Godalming*; from whence it passes to *Guildford*, and so into the *Thames* at *Weybridge*; and thus at the *Nore* into the *German* ocean.

* This spring produced, *September* 14, 1781, after a severe hot Summer, and a preceding dry Spring and Winter, nine gallons of water in a minute, which is five hundred and forty in an hour, and twelve thousand nine hundred and sixty, or two hundred and sixteen hogsheads, in twenty-four hours, or one natural day. At this time many of the wells failed, and all the ponds in the vales were dry.

Our wells, at an average, run to about sixty-three feet, and when sunk to that depth, seldom fail; but produce a fine limpid water soft to the taste, and much commended by those who drink the pure element, but which does not lather well with soap.

To the north-west, north and east of the village is a range of fair inclosures, consisting of what is called a *white malm*, a sort of rotten or rubble stone which, when turned up to the frost and rain, moulders to pieces, and becomes manure to itself.*

Still on to the north-east, and a step lower, is a kind of white land, neither chalk nor clay, neither fit for pasture nor for the plough, yet kindly for hops, which root deep into the freestone, and have their poles and wood for charcoal growing just at hand. This white soil produces the brightest hops.

* This soil produces good wheat and clover.

As the parish still inclines down towards *Wolmer-forest,* at the juncture of the clays andsand the soil becomes a wet, sandy loam, remarkable for timber, and infamous for roads. The oaks of *Temple* and *Blackmoor* stand high in the estimation of purveyors, and have furnished much naval timber; while the trees on the freestone grow large, but are what workmen call *shakey,* and so brittle as often to fall to pieces in sawing. Beyond the sandy loam the soil becomes an hungry lean sand, till it mingles with the forest; and will produce little without the assistance of lime and turnips.

LETTER II.

TO THE SAME.

In the court of *Norton* farm house, a manor farm to the north-west of the village, on the white malms, stood within these twenty years a *broad-leaved elm*, or *wych hazel, ulmus folio latissimo scabro* of *Ray*, which, though it had lost a considerable leading bough in the great storm in the year 1703, equal to a moderate tree, yet, when felled, contained eight loads of timber; and being too bulky for a carriage, was sawn off at seven feet above the butt, where it measured near eight feet in the diameter. This elm I mention to show to what a bulk *planted elms* may attain; as this tree must certainly have been such from its situation. In the centre of the village, and near the church, is a square piece of ground surrounded by houses, and vulgarly called

The Plestor. In the midst of this spot stood, in old times, a vast oak, with a short squat body, and huge horizontal arms extending almost to the extremity of the area. This venerable tree, surrounded with stone steps, and seats above them, was the delight of old and young, and a place of much resort in Summer evenings; where the former sat in grave debate, while the latter frolicked and danced before them. Long might it have stood, had not the amazing tempest in 1703 overturned it at once, to the infinite regret of the inhabitants, and the vicar, who bestowed several pounds in setting it in its place again; but all his care could not avail; the tree sprouted for a time, then withered and died. This oak I mention to show to what a bulk *planted oaks* also may arrive: and planted this tree must certainly have been, as appears from what is known concerning the antiquities of the village.

On the *Blackmoor* estate there is a small wood called *Losel's*, of a few acres, that was lately furnished with a set of oaks of a peculiar growth and great value; they were tall and taper like firs, but standing near together, had very small heads, only a little brush without any large limbs. About twenty years ago the bridge at the *Toy*, near *Hampton Court* being much decayed, some trees were wanted for the repairs that were fifty feet long without bough, and would measure twelve inches diameter at the little end. Twenty such trees did a purveyor find in this little wood, with this advantage, that many of them answered the description at sixty feet. These trees were sold for twenty pounds a-piece.

In the centre of this grove there stood an oak, which, though shapely and tall on the whole, bulged out into a large excrescence about the middle of the

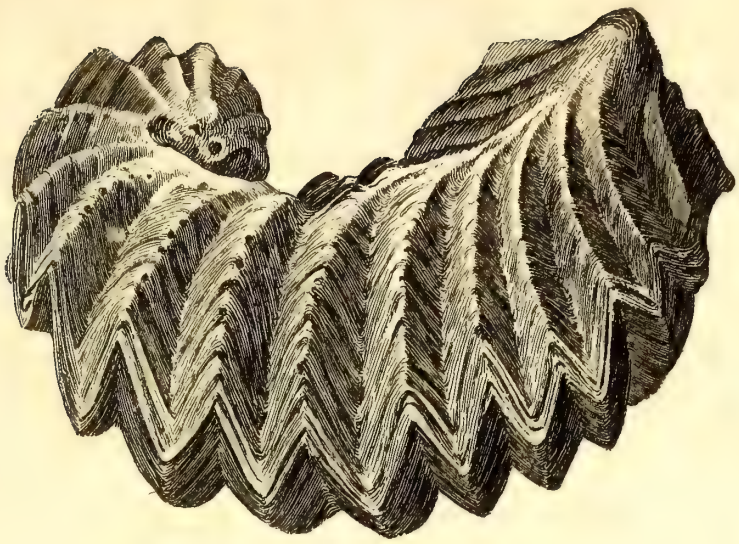
stem. On this a pair of ravens had fixed their residence for such a series of years, that the oak was distinguished by the title of *The Raven Tree*. Many were the attempts of the neighbouring youths to get at this *eyry*: the difficulty whetted their inclinations, and each was ambitious of surmounting the arduous task. But when they arrived at the swelling, it jutted out so in their way, and was so far beyond their grasp, that the most daring lads were awed, and acknowledged the undertaking to be too hazardous. So the ravens built on, nest upon nest, in perfect security, till the fatal day arrived in which the wood was to be levelled. It was in the month of *February*, when those birds usually sit. The saw was applied to the butt, the wedges were inserted into the opening, the woods echoed to the heavy blows of the beetle or mallet, the tree nodded to its fall; but still the dam sat on. At last, when

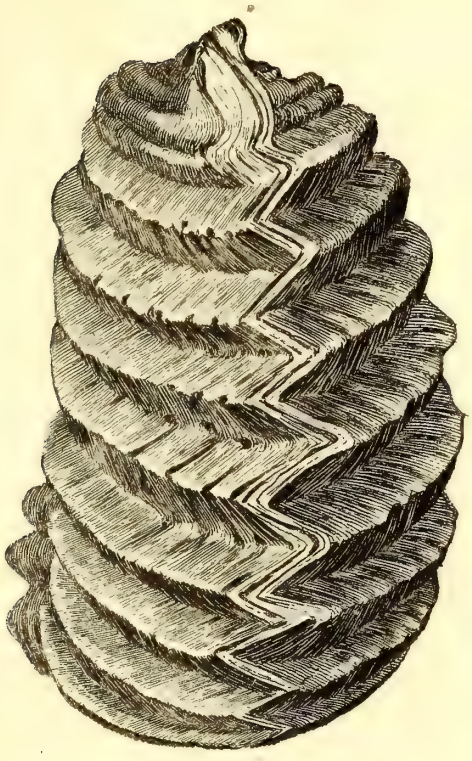
it gave way, the bird was flung from her nest; and, though her parental affection deserved a better fate, was whipped down by the twigs, which brought her dead to the ground.

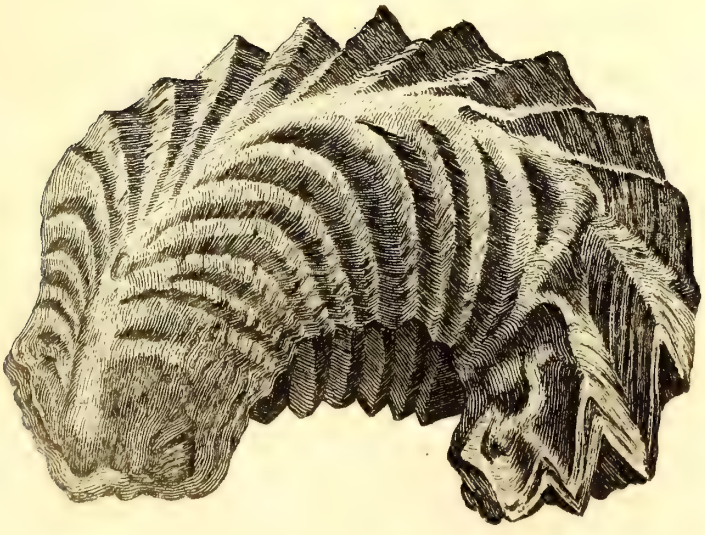
LETTER III.

TO THE SAME

THE fossil shells of this district, and sorts of stone, such as have fallen within my observation, must not be passed over in silence. And first I must mention, as a great curiosity, a specimen that was ploughed up in the chalky fields, near the side of the *Down*, and given to me for the singularity of its appearance, which to an incurious eye, seems like a petrified fish of about four inches long, the cardo passing for a head and mouth. It is in reality a *bivalve* of the *Linnæan*







MYTILUS, *Crista Galli.*

Genus of *Mytilis* and the species of *Crista Galli*; called by *Lister*, *Rastellum*; by *Rumphius*, *Ostreum plicatum minus*; by *D'Argenville*, *Auris Porci*, s. *Crista Galli*; and by those who make collections *cock's comb*. Though I applied to several such in London, I never could meet with an entire specimen; nor could I ever find in books any engraving from a perfect one. In the superb *museum* at *Leicester house*, permission was given me to examine for this article; and though I was disappointed as to the fossil, I was highly gratified with the sight of several of the shells themselves in high preservation. This bivalve is only known to inhabit the *Indian* ocean, where it fixes itself to a *zoophyte*, known by the name *Gorgonia*. The curious foldings of the suture the one into the other, the alternate flutings or grooves, and the curved form of my specimen being much easier expressed by the pencil than by words, I have caused it to be drawn and engraved.

Cornua Ammonis are very common about this village. As we were cutting an inclining path up *The Hanger*, the labourers found them frequently on that steep, just under the soil, in the chalk, and of a considerable size. In the lane above *Well-head*, in the way to *Emshot*, they abound in the bank in a darkish sort of marl; and are usually very small and soft: but in *Clay's Pond* a little farther on, at the end of the pit, where the soil is dug out for manure, I have occasionally observed them of large dimensions, perhaps fourteen or sixteen inches in diameter. But as these did not consist of firm stone, but were formed of a kind of *terra lapidosa*, or hardened clay, as soon as they were exposed to the rains and frost they mouldered away. These seemed as if they were a very recent production. In the chalk-pit, at the north-west end of *The Hanger*, large *nautili* are sometimes observed.

In the very thickest strata of our free-

stone, and at considerable depths, well-diggers often find large *scallops* or *pectines*, having both shells deeply striated, and ridged and furrowed alternately. They are highly impregnated with, if not wholly composed of, the stone of the quarry.

LETTER IV.

TO THE SAME.

As in a former letter the *freestone* of this place has been only mentioned incidentally, I shall here become more particular.

This stone is in great request for hearth-stones, and the beds of ovens: and in lining of lime-kilns it turns to good account; for the workmen use

sandy loam instead of mortar; the sand of which fluxes,* and runs by the intense heat, and so cases over the whole face of the kiln with a strong vitrified coat like glass, that it is well preserved from injuries of weather, and endures thirty or forty years. When chiselled smooth, it makes elegant fronts for houses, equal in colour and grain to the *Bath* stone; and superior in one respect, that, when seasoned, it does not scale. Decent chimney pieces are worked from it of much closer and finer grain than *Portland;* and rooms are floored with it; but it proves rather too soft for this purpose. It is a freestone, cutting in all directions; yet has something of a grain parallel with the horizon, and therefore should not be *surbedded,* but laid in the same position that it grows in the

* There may probably be also in the chalk itself that is burnt for lime a proportion of sand; for few chalks are so pure as to have none.

quarry.* On the ground abroad this firestone will not succeed for pavements, because, probably, some degree of saltness prevailing within it, the rain tears the slabs to pieces.† Though this stone is too hard to be acted on by vinegar; yet both the white part, and even the *blue rag*, ferments strongly in mineral acids. Though the white stone will not bear wet, yet in every quarry, at intervals, there are thin strata of *blue rag*, which resist rain and frost, and are excellent for pitching of stables, paths and courts, and for building of dry walls against banks; a valuable species of fencing, much in use in this village, and for mending of roads.

* To *surbed* stone is to set it edgewise, contrary to the posture it had in the quarry, says Dr. *Plot, Oxfordsh.* p. 77. But *surbedding* does not succeed in our dry walls; neither do we use it so in ovens, though he says it is best for *Teynton* stone.

† "Firestone is full of salts, and has no sulphur: "must be close-grained, and have no interstices. No- "thing supports fire like salts; saltstone perishes ex- "posed to wet and frost." *Plot's Staff.* p. 152.

This *rag* is rugged and stubborn, and will not hew to a smooth face; but is very durable: yet, as these strata are shallow and lie deep, large quantities cannot be procured but at considerable expense. Among the *blue rags* turn up some blocks tinged with a stain of *yellow* or *rust colour,* which seem to be nearly as lasting as the blue; and every now and then balls of a friable substance, like rust of iron, called *rust balls.*

In *Wolmer Forest* I see but one sort of stone, called by the workmen *sand,* or *forest, stone.* This is generally of the colour of rusty iron, and might probably be worked as iron ore; is very hard and heavy, and of a firm, compact texture, and composed of a small roundish crystalline grit, cemented together by a brown, terrene, ferruginous matter; will not cut without difficulty, nor easily strike fire with steel. Being often found in broad flat pieces, it makes good pavement for paths about houses, never be-

coming slippery in frost or rain; is excellent for dry walls, and is sometimes used in buildings. In many parts of that waste it lies scattered on the surface of the ground; but is dug on *Weaver's Down,* a vast hill on the eastern verge of that forest, where the pits are shallow, and the stratum thin. This stone is imperishable.

From a notion of rendering their work the more elegant, and giving it a finish, masons chip this stone into small fragments about the size of the head of a large nail; and then stick the pieces into the wet mortar along the joints of their freestone walls: this embellishment carries an odd appearance, and has occasioned strangers sometimes to ask us pleasantly, "whether we fastened "our walls together with tenpenny "nails?"

LETTER V.

TO THE SAME.

AMONG the singularities of this place the two rocky hollow lanes, the one to *Alton*, and the other to the forest, deserve our attention. These roads, running through the malm lands, are, by the traffick of ages, and the fretting of water, worn down through the first stratum of our freestone, and partly through the second; so that they look more like water-courses than roads; and are bedded with naked *rag* for furlongs together. In many places they are reduced sixteen or eighteen feet beneath the level of the fields; and after floods, and in frosts, exhibit very grotesque, and wild appearances, from the tangled roots that are twisted among the strata, and from the torrents rushing down their broken sides; and especially when those cascades are frozen into icicles, hanging in all the

fanciful shapes of frost-work. These rugged gloomy scenes affright the ladies when they peep down into them from the paths above, and make timid horsemen shudder while they ride along them; but delight the naturalist with their various botany, and particularly with their curious *filices* with which they abound.

The manor of *Selborne*, was it strictly looked after, with all its kindly aspects, and all its sloping coverts, would swarm with game; even now, hares, partridges and pheasants abound; and in old days woodcocks were as plentiful. There are few quails, because they more affect open fields than inclosures; after harvest some few land-rails are seen.

The parish of *Selborne*, by taking in so much of the forest, is a vast district. Those who tread the bounds are employed part of three days in the business, and are of opinion that the outline, in all its curves and indentings, does not comprise less than thirty miles.

The village stands in a sheltered spot, secured by *The Hanger* from the strong westerly winds. The air is soft, but rather moist from the effluvia of so many trees; yet perfectly healthy and free from agues.

The quantity of rain that falls on it is very considerable, as may be supposed in so woody and mountainous a district. As my experience in measuring the water is but of short date, I am not qualified to give the mean quantity.* I only know that

	Inch.	Hund.
From May 1, 1779, to the end of the year there fell - - - - -	28	37!
From Jan. 1, 1780, to Jan. 1, 1781 -	27	32
From Jan. 1, 1781, to Jan. 1, 1782 -	30	71
From Jan. 1, 1782, to Jan. 1. 1783 -	50	26!
From Jan. 1, 1783, to Jan. 1, 1784 -	33	71
From Jan. 1, 1784, to Jan. 1, 1785 -	33	80
From Jan. 1, 1785, to Jan. 1, 1786 -	31	55
From Jan. 1, 1786, to Jan. 1, 1787 -	39	57

* A very intelligent gentleman assures me (and he speaks from upwards of forty years experience) that the mean rain of any place cannot be ascertained till

The village of *Selborne*, and large hamlet of *Oakhanger*, with the single farms, and many scattered houses along the verge of the forest, contain upwards of six hundred and seventy inhabitants.

We abound with poor; many of whom are sober and industrious, and live comfortably in good stone or brick cottages, which are glazed, and have chambers above stairs: mud buildings we have none. Besides the employment from husbandry, the men work in hop gardens, of which we have many; and fell and bark timber. In the spring and summer the women weed the corn; and enjoy a second harvest in September by

a person has measured it for a very long period. "If I "had only measured the rain," says he, "for the four "first years, from 1740 to 1743, I should have said "the mean rain at *Lyndon* was $16\frac{1}{2}$ inch. for the "year; if from 1740 to 1750, $18\frac{1}{2}$ inches. The "mean rain before 1763 was $20\frac{1}{4}$; from 1763 and "since, $25\frac{1}{2}$; from 1770 to 1780, 26. If only 1773, "1774 and 1775, had been measured, *Lyndon* "mean rain would have been called 32 inches."

hop-picking. Formerly, in the dead months they availed themselves greatly by spinning wool, for making of *barragons*, a genteel corded stuff, much in vogue at that time for summer wear; and chiefly manufactured at *Alton*, a neighbouring town, by some of the people called Quakers. The inhabitants enjoy a good share of health and longevity; and the parish swarms with children.

LETTER VI.

TO THE SAME.

Should I omit to describe with some exactness the *forest* of *Wolmer*, of which three fifths perhaps lie in this parish, my account of *Selborne* would be very imperfect, as it is a district abounding with many curious productions, both animal and vegetable; and has often afforded me much entertainment both as a sportsman and as a naturalist.

The royal *forest* of *Wolmer* is a tract of land of about seven miles in length, by two and a half in breadth, running nearly from North to South, and is abutted on, to begin to the South, and so to proceed eastward, by the parishes of *Greatham*, *Lysse*, *Rogate*, and *Trotton*, in the county of *Sussex*; by *Bramshot*, *Hedleigh*, and *Kingsley*. This royalty consists entirely of sand covered with heath and fern;

but is somewhat diversified with hills and dales, without having one standing tree in the whole extent. In the bottoms, where the waters stagnate, are many bogs, which formerly abounded with subterraneous trees: though Dr. *Plot* says positively,* that "there never "were any fallen trees hidden in the "mosses of the southern counties." But he was mistaken: for I myself have seen cottages on the verge of this wild district, whose timbers consisted of a black hard wood, looking like oak, which the owners assured me they procured from the bogs by probing the soil with spits, or some such instruments: but the peat is so much cut out, and the moors have been so well examined, that none has been found of late.† Besides the oak, I

* See his Hist. of *Staffordshire.*

† Old people have assured me, that on a Winter's morning they have discovered these trees, in the bogs, by the hoar frost, which lay longer over the space were they were concealed, than on the sur-

have also been shown pieces of fossil-wood of a paler colour, and softer nature, which the inhabitants called fir: but,

rounding morass. Nor does this seem to be a fanciful notion, but consistent with true philosophy. Dr. *Hales* saith, "That the warmth of the earth, at "some depth under ground, has an influence in pro-"moting a thaw, as well as the change of the wea-"ther from a freezing to a thawing state, is mani-"fest, from this observation, viz. Nov. 29, 1731, a "little snow having fallen in the night, it was, by "eleven the next morning, mostly melted away on "the surface of the earth, except in several places in "*Bushy-park*, where there were *drains* dug and "covered with earth, on which the snow continued "to lie, whether those drains were full of water or "dry; as also where *elm-pipes* lay under ground: a "plain proof this, that those drains intercepted the "warmth of the earth from ascending from greater "depths below them; for the snow lay where the "drain had more than four feet depth of earth over "it. It continued also to lie on thatch, tiles, and the "tops of walls." See *Hales's* Hæmastatics, p. 360. Quere, Might not such observations be reduced to domestic use, by promoting the discovery of old obliterated drains and wells about houses; and in Roman stations and camps lead to the finding of pavements, baths and graves, and other hidden relics of curious antiquity?

upon a nice examination, and trial by fire, I could discover nothing resinous in them ; and therefore rather suppose that they were parts of a willow or alder, or some such aquatic tree.

This lonely domain is a very agreeable haunt for many sorts of wild fowls, which not only frequent it in the winter, but breed there in the summer ; such as lapwings, snipes, wild-ducks, and, as I have discovered within these few years, teals. Partridges in vast plenty are bred in good seasons on the verge of this forest, into which they love to make excursions : and in particular, in the dry Summer of 1740 and 1741, and some years after, they swarmed to such a degree, that parties of unreasonable sportsmen killed twenty and sometimes thirty brace in a day.

But there was a nobler species of game in this forest, now extinct, which I have heard old people say abounded much before shooting flying became so common, and that was the *heath-cock*, or *black*

game. When I was a little boy I recollect one coming now and then to my father's table. The last pack remembered was killed about thirty-five years ago: and within these ten years one solitary *grey hen* was sprung by some beagles in beating for a hare. The sportsman cried out, "A hen pheasant;" but a gentleman present, who had often seen black game in the north of England, assured me that it was a grey hen.

Nor does the loss of our black game prove the only gap in the *Fauna Selborniensis;* for another beautiful link in the chain of beings is wanting, I mean the *red deer,* which toward the beginning of this century amounted to about five hundred head, and made a stately appearance. There is an old keeper, now alive, named *Adams,* whose great grandfather (mentioned in a perambulation taken in 1635) grandfather, father, and self, enjoyed the head keepership of *Wolmer forest* in succession for more than an hundred years. This person assures me, that his father

has often told him that Queen *Anne,* as she was journeying on the *Portsmouth* road, did not think the forest of *Wolmer* beneath her royal regard. For she came out of the great road at *Lippock,* which is just by, and, reposing herself on a bank smoothed for that purpose, lying about half a mile to the east of *Wolmer-pond,* and still called *Queen's-bank,* saw with great complacency and satisfaction the whole herd of red deer brought by the keepers along the vale before her, consisting then of about five hundred head. A sight this worthy the attention of the greatest sovereign! But he farther adds that, by means of the *Waltham blacks,* or, to use his own expression, as soon as they began *blacking,* they were reduced to about fifty head, and so continued decreasing till the time of the late Duke of *Cumberland.* It is now more than thirty years ago that his highness sent down an huntsman, and six yeomen-prickers, in scarlet jackets laced with gold, attended by the stag-hounds; or-

dering them to take every deer in this forest alive, and to convey them in carts to *Windsor*. In the course of the summer they caught every stag, some of which showed extraordinary diversion; but in the following winter, when the hinds were also carried off, such fine chases were exhibited as served the country people for matter of talk and wonder for years afterwards. I saw myself one of the yeomen-prickers single out a stag from the herd, and must confess that it was the most curious feat of activity I ever beheld, superior to any thing in Mr. *Astley's* riding-school. The exertions made by the horse and deer much exceeded all my expectations; though the former greatly excelled the latter in speed. When the devoted deer was separated from his companions, they gave him, by their watches, law, as they called it, for twenty minutes; when, sounding their horns, the stop-dogs were permitted to pursue, and a most gallant scene ensued.

LETTER VII.

TO THE SAME.

THOUGH large herds of deer do much harm to the neighbourhood, yet the injury to the morals of the people is of more moment than the loss of their crops. The temptation is irresistible; for most men are sportsmen by constitution: and there is such an inherent spirit for hunting in human nature, as scarce any inhibitions can restrain. Hence, towards the beginning of this century, all this country was wild about deer-stealing. Unless he was a *hunter*, as they affected to call themselves, no young person was allowed to be possessed of manhood or gallantry. The *Waltham blacks* at length committed such enormities, that government was forced to interfere with that severe and sanguinary act called the *black act*,* which now comprehends more felo-

* Statute 9, *Geo.* I. c. 22.

nies than any law that ever was framed before. And, therefore, a late bishop of *Winchester*, when urged to re-stock *Waltham-chase*,* refused, from a motive worthy of a prelate, replying that "It had done mischief enough already."

Our old race of deer-stealers are hardly extinct yet: it was but a little while ago that, over their ale, they used to recount the exploits of their youth; such as watching the pregnant hind to her lair, and, when the calf was dropped, paring its feet with a penknife to the quick to prevent its escape, till it was large and fat enough to be killed; the shooting at one of their neighbours with a bullet in a turnip-field by moonshine, mistaking him for a deer; and the losing a dog in the following extraordinary manner:—Some fellows, suspecting that a calf new-fallen was deposited in a certain spot of thick fern, went with a lurcher, to surprise it; when the

* This chase remains un-stocked to this day; the bishop was Dr. *Hoadley*.

parent-hind rushed out of the brake, and, taking a vast spring with all her feet close together, pitched upon the neck of the dog, and broke it short in two.

Another temptation to idleness and sporting, was a number of rabbits, which possessed all the hillocks and dry places; but these being inconvenient to the huntsmen, on account of their burrows, when they came to take away the deer, they permitted the country-people to destroy them all.

Such forests and wastes, when their allurements to irregularities are removed, are of considerable service to neighbourhoods that verge upon them, by furnishing them with peat and turf for their firing; with fuel for the burning their lime; and with ashes for their grasses; and by maintaining their geese and their stock of young cattle at little or no expense.

The manor farm of the parish of *Greatham* has an admitted claim, I see (by an old record taken from the *Tower of Lon-*

don), of turning all live stock on the forest, at proper seasons, *bidentibus exceptis.** The reason, I presume, why sheep† are excluded is, because, being such close grazers, they would pick out all the finest grasses, and hinder the deer from thriving.

Though (by statute 4 and 5 *W.* and *Mary*) c. 23, "to burn on any waste, be-" tween *Candlemas* and *Midsummer*, any " grig, ling, heath and furze, goss or fern, " is punishable with whipping and con-" finement in the house of correction;" yet, in this forest, about *March* or *April*, according to the dryness of the season, such vast heath-fires are lighted up, that they often get to a masterless head, and, catching the hedges, have sometimes been communicated to the underwoods, woods and coppices, where great damage has ensued. The plea for these burnings is, that,

* For this privilege the owner of that estate used to pay to the king annually seven bushels of oats.

† In *The Holt*, where a full stock of fallow-deer has been kept up till lately, no sheep are admitted to this day.

when the old coat of heath, &c. is consumed, young will sprout up, and afford much tender brouze for cattle; but, where there is large old furze, the fire, following the roots, consumes the very ground; so that for hundreds of acres nothing is to be seen but smother and desolation, the whole circuit round looking like the cinders of a volcano; and the soil being quite exhausted, no traces of vegetation are to be found for years. These conflagrations, as they take place usually with a north-east or east wind, much annoy this village with their smoke, and often alarm the country; and once, in particular, I remember that a gentleman, who lives beyond *Andover*, coming to my house, when he got on the downs between that town and *Winchester*, at twenty-five miles distance, was surprised much with smoke and a hot smell of fire; and concluded that *Alresford* was in flames; but, when he came to that town, he then had apprehensions for the next village, and so on to the end of his journey.

On two of the most conspicuous eminences of this forest, stand two *arbours* or *bowers*, made of the boughs of oaks; the one called *Waldon-lodge*, the other *Brimstone-lodge*: these the keepers renew annually on the feast of St. *Barnabas*, taking the old materials for a perquisite. The farm called *Blackmoor*, in this parish, is obliged to find the posts and brushwood for the former; while the farms at *Greatham*, in rotation, furnish for the latter; and are all enjoined to cut and deliver the materials at the spot. This custom I mention, because I look upon it to be of very remote antiquity.

LETTER VIII.

TO THE SAME.

On the verge of the forest, as it is now circumscribed, are three considerable lakes, two in *Oakhanger*, of which I have nothing particular to say; and one called

Bin's or *Bean's pond*, which is worthy the attention of a naturalist or a sportsman. For, being crowded at the upper end with willows, and with the *carex cespitosa*,* it affords such a safeand pleasing shelter to wild ducks, teals, snipes, &c. that they breed there. In the winter this covert is also frequented by foxes, and sometimes by pheasants; and the bogs produce many curious plants. [For which consult letter XLII. to Mr. *Barrington*.]

By a *perambulation* of *Wolmer forest* and *The Holt*, made in 1635, and in the eleventh year of *Charles* the first (which now lies before me), it appears that the limits of the former are much circumscribed. For, to say nothing of the farther

* I mean that sort which, rising into tall hassocks, is called by the foresters *torrets*; a corruption, I suppose, of turrets.

Note. In the beginning of the Summer 1787, the royal forests of *Wolmer* and *Holt* were measured by persons sent down by government.

side, with which I am not so well acquainted, the bounds on this side, in old times, came into *Binswood;* and extended to the ditch of *Ward-le-ham Park,* in which stands the curious mount called *King John's Hill,* and *Lodge Hill;* and to the verge of *Hartley Mauduit,* called *Mauduit-hatch;* comprehending also *Shorts-heath, Oakhanger,* and *Oakwoods;* a large district, now private property, though once belonging to the royal domain.

It is remarkable, that the term *purlieu* is never once mentioned in this long roll of parchment. It contains, besides the *perambulation,* a rough estimate of the value of the timbers, which were considerable, growing at that time in the district of *The Holt;* and enumerates the officers, superior and inferior, of those joint forests, for the time being, and their ostensible fees and perquisites. In those days, as at present, there were hardly any trees in *Wolmer forest.*

Within the present limits of the forest

are three considerable lakes, *Hogmer, Cranmer,* and *Wolmer;* all of which are stocked with carp, tench, eels, and perch: but the fish do not thrive well, because the water is hungry, and the bottoms are a naked sand.

A circumstance respecting these ponds, though by no means peculiar to them, I cannot pass over in silence; and that is, that instinct by which in Summer all the kine, whether oxen, cows, calves, or heifers, retire constantly to the water during the hotter hours; where, being more exempt from flies, and inhaling the coolness of that element, some belly deep, and some only to mid-leg, they ruminate and solace themselves from about ten in the morning till four in the afternoon, and then return to their feeding. During this great proportion of the day they drop much dung, in which insects nestle; and so supply food for the fish, which would be poorly subsisted but from this contingency. Thus Nature, who is a great

economist, converts the recreation of one animal to the support of another! *Thomson*, who was a nice observer of natural occurrences, did not let this pleasing circumstance escape him. He says, in his *Summer*,

" A various group the herds and flocks compose:
" ———————— on the grassy bank
" Some ruminating lie; while others stand,
" Half in the flood, and often bending, sip
" The circling surface."

Wolmer-pond, so called, I suppose, for eminence sake, is a vast lake for this part of the world, containing, in its whole circumference, 2,646 yards, or very near a mile and a half. The length of the north-west and opposite side is about 704 yards, and the breadth of the south-west end about 456 yards. This measurement, which I caused to be made with good exactness, gives an area of about sixty-six acres, exclusive of a large irregular arm at the north-east corner,

which we did not take into the reckoning.

On the face of this expanse of waters, and perfectly secure from fowlers, lie all day long, in the winter season, vast flocks of ducks, teals, and widgeons, of various denominations; where they preen and solace and rest themselves, till towards sun-set, when they issue forth in little parties (for in their natural state they are all birds of the night) to feed in the brooks and meadows: returning again with the dawn of the morning. Had this lake an arm or two more, and were it planted round with thick covert (for now it is perfectly naked), it might make a valuable decoy.

Yet neither its extent, nor the clearness of its water, nor the resort of various and curious fowls, nor its picturesque groups of cattle, can render this *meer* so remarkable as the great quantity of coins that were found in its bed about forty years ago.

LETTER IX.

TO THE SAME.

By way of supplement, I shall trouble you once more on this subject, to inform you that *Wolmer*, with her sister forest *Ayles Holt*, alias *Alice Holt*,* as it is called in old records, is held by grant from the crown for a term of years.

The grantees that the author remembers are Brigadier-General *Emanuel Scroope Howe*, and his lady, *Ruperta*, who was a natural daughter of Prince *Rupert* by *Margaret Hughs*; a Mr. *Mordaunt*, of the *Peterborough* family, who married a dowager Lady *Pembroke*; *Henry Bilson*

* "In Rot. Inquisit. de statu forest. in Scaccar. 36. Ed. 3, it is called *Aisholt*."

In the same, "Tit. *Wolmer* and *Aisholt* Hantisc. "Dominus Rex habet unam capellam in *haia* suâ de "Kingesle." "*Haia, sepes, sepimentum, parcus*: a "Gall. *haie* and *haye*." Spelman's Glossary.

Legge and lady; and now Lord *Stawel*, their son.

The lady of General *Howe* lived to an advanced age, long surviving her husband; and, at her death, left behind her many curious pieces of mechanism of her father's constructing, who was a distinguished mechanic and artist,* as well as warrior; and, among the rest, a very complicated clock, lately in possession of Mr. *Elmer*, the celebrated game-painter at *Farnham*, in the county of *Surrey*.

Though these two forests are only parted by a narrow range of inclosures, yet no two soils can be more different: for *The Holt* consists of a strong loam, of a miry nature, carrying a good turf, and abounding with oaks that grow to be large timber; while *Wolmer* is nothing but a hungry, sandy, barren waste.

The former, being all in the parish of *Binsted*, is about two miles in extent from north to south, and near as much from

* This prince was the inventor of *mezzotinto*.

east to west; and contains within it many woodlands and lawns, and the *great lodge* where the grantees reside; and a smaller lodge called *Goose Green*; and is abutted on by the parishes of *Kingsley, Frinsham, Farnham,* and *Bentley;* all of which have right of common.

One thing is remarkable; that, though *The Holt* has been of old well-stocked with fallow-deer, unrestrained by any pales or fences more than a common hedge, yet they were never seen within the limits of *Wolmer;* nor were the red deer of *Wolmer* ever known to haunt the thickets or glades of *The Holt.*

At present the deer of *The Holt* are much thinned and reduced by the night-hunters, who perpetually harass them in spite of the efforts of numerous keepers, and the severe penalties that have been put in force against them as often as they have been detected, and rendered liable to the lash of the law. Neither fines nor imprisonments can deter them:

so impossible is it to extinguish the spirit of sporting, which seems to be inherent in human nature.

General *Howe* turned out some *German* wild boars and sows in his forests, to the great terror of the neighbourhood; and, at one time, a wild bull or buffalo: but the country rose upon them, and destroyed them.

A very large fall of timber, consisting of about one thousand oaks, has been cut this Spring (viz. 1784) in *The Holt forest;* one fifth of which, it is said, belongs to the grantee, Lord *Stawel.* He lays claim also to the lop and top: but the poor of the parishes of *Binsted* and *Frinsham*, *Bentley* and *Kingsley,* assert that it belongs to them; and, assembling in a riotous manner, have actually taken it all away. One man, who keeps a team, has carried home, for his share, forty stacks of wood. Forty-five of these people his lordship has served with actions. These trees, which were very sound, and in high perfection,

were *winter-cut,* viz. in *February* and *March,* before the bark would run. In old times *The Holt* was estimated to be eighteen miles, computed measure, from water-carriage, viz. from the town of *Chertsey,* on the *Thames;* but now it is not half that distance, since the *Wey* is made navigable up to the town of *Godalming* in the county of *Surrey.*

LETTER X.

TO THE SAME.

August 4, 1767.

It has been my misfortune never to have had any neighbours whose studies have led them towards the pursuit of natural knowledge; so that, for want of a companion to quicken my industry and sharpen my attention, I have made but slender progress in a kind of information to which I have been attached from my childhood.

As to *swallows (hirundines rusticæ)* being found in a torpid state during the winter in the Isle of *Wight,* or any part of this country, I never heard any such account worth attending to. But a clergyman, of an inquisitive turn, assures me, that, when he was a great boy, some workmen, in pulling down the battlements of a church tower early in the Spring, found two or three *swifts (hirundines apodes)* among the rubbish, which were, at first appearance, dead; but, on being carried toward the fire, revived. He told me that, out of his great care to preserve them, he put them in a paper bag, and hung them by the kitchen fire, where they were suffocated.

Another intelligent person has informed me that, while he was a schoolboy at *Brighthelmstone,* in *Sussex,* a great fragment of the chalk-cliff fell down one stormy winter on the beach; and that many people found *swallows* among the rubbish: but, on my questioning him

whether he saw any of those birds himself; to my no small disappointment, he answered me in the negative; but that others assured him they did.

Young broods of *swallows* began to appear this year on *July* the eleventh, and young *martins (hirundines urbicæ)* were then fledged in their nests. Both species will breed again once. For I see by my *fauna* of last year, that young broods came forth so late as *September* the eighteenth. Are not these late hatchings more in favour of hiding than migration? Nay, some young martins remained in their nests last year so late as *September* the twenty-ninth; and yet they totally disappeared with us by the fifth of *October*.

How strange it is, that the *swift*, which seems to live exactly the same life with the *swallow* and *house-martin*, should leave us before the middle of *August* invariably! while the latter stay often till the middle of *October*; and once I saw numbers of house-martins on the seventh of *November*. The martins and *red-wing fieldfares* were flying

in sight together; an uncommon assemblage of summer and winter birds!

A little yellow bird (it is either a species of the *alauda trivialis,* or rather perhaps of the *motacilla trochilus*) still continues to make a sibilous shivering noise in the tops of tall woods. The *stoparola* of *Ray* (for which we we have as yet no name in these parts) is called, in your *Zoology,* the *fly-catcher.* There is one circumstance characteristic of this bird, which seems to have escaped observation, and that is, it takes its stand on the top of some stake or post, from whence it springs forth on its prey, catching a fly in the air, and hardly ever touching the ground, but returning still to the same stand for many times together.

I perceive there are more than one species of the *motacilla trochilus:* Mr. *Derham* supposes, in *Ray's Philos. Letters,* that he has discovered three. In these there is again an instance of some very common birds that have as yet no *English* name.

Mr. *Stillingfleet* makes a question whether the *black-cap (motacilla atricapilla)* be a bird of passage or not; I think there is no doubt of it: for, in *April*, in the first fine weather, they come trooping, all at once, into these parts, but are never seen in the Winter. They are delicate songsters.

Numbers of *snipes* breed every Summer in some moory ground on the verge of this parish. It is very amusing to see the cock bird on wing at that time, and to hear his piping and humming notes.

I have had no opportunity yet of procuring any of those mice which I mentioned to you in town. The person that brought me the last says they are plenty in harvest, at which time I will take care to get more; and will endeavour to put the matter out of doubt, whether it be a non-descript species or not.

I suspect much there may be two species of water-rats. *Ray* says, and *Linnæus* after him, that the water-rat is web-

footed behind. Now I have discovered a rat on the banks of our little stream that is not web-footed, and yet is an excellent swimmer and diver: it answers exactly to the *mus amphibius* (See *Syst. Nat.)* which he says, "*natat in fossis & urinatur.*" I should be glad to procure one "*plantis palmatis.*" *Linnæus* seems to be in a puzzle about his *mus amphibius*, and to doubt whether it differs from his *mus terrestris;* which, if it be, as he allows, the "*mus agrestis capite grandi brachyuros*" of *Ray*, is widely different from the water-rat, both in size, make, and manner of life.

As to the *falco*, which I mentioned in town, I shall take the liberty to send it down to you into *Wales;* presuming on your candour, that you will excuse me if it should appear as familiar to you as it is strange to me. Though mutilated "*qualem dices . . . antehac fuisse, tales*
"*cum sint reliquiæ!*"

It haunted a marshy piece of ground in quest of wild-ducks and snipes; but,

when it was shot, had just knocked down a rook, which it was tearing in pieces. I cannot make it answer to any of our *English* hawks; neither could I find any like it at the curious exhibition of stuffed birds in *Spring Gardens.* I found it nailed up at the end of a barn, which is the countryman's museum.

The parish I live in is a very abrupt, uneven country, full of hills and woods, and therefore full of birds.

LETTER XI.

TO THE SAME.

SELBORNE, September 9, 1767.

IT will not be without impatience that I shall wait for your thoughts with regard to the *falco;* as to its weight, breadth, &c. I wish I had set them down at the time: but to the best of my remembrance, it weighed two pounds and eight ounces, and measured, from wing to wing, thirty-

eight inches. Its *cere* and feet were yellow, and the circle of its eyelids a bright yellow. As it had been killed some days, and the eyes were sunk, I could make no good observation on the colour of the pupils and the *irides*.

The most unusual birds I ever observed in these parts were a pair of *hoopoes (upupa)*, which came several years ago in the summer, and frequented an ornamented piece of ground, which joins to my garden, for some weeks. They used to march about in a stately manner, feeding in the walks, many times in the day; and seemed disposed to breed in my outlet; but were frighted and persecuted by idle boys, who would never let them be at rest.

Three *gross-beaks (loxia coccothraustes)* appeared some years ago in my fields, in the Winter; one of which I shot; since that, now and then one is occasionally seen in the same dead season.

A *cross-bill (loxia curvirostra)* was killed last year in this neighbourhood.

Our streams, which are small, and rise only at the end of the village, yield nothing but the *bull's head* or *miller's thumb (gobius fluviatilis capitatus)*, the *trout (trutta fluviatilis)*, the *eel (anguilla)*, the *lampern (lampætra parva et fluviatilis)*, and the *stickle-back (pisciculus aculeatus)*.

We are twenty miles from the sea, and almost as many from a great river, and therefore see but little of sea-birds. As to wild fowls, we have a few teams of *ducks* bred in the moors where the snipes breed; and multitudes of *widgeons* and *teals* in hard weather frequent our lakes in the forest.

Having some acquaintance with a tame *brown owl*, I find that it casts up the fur of mice, and the feathers of birds in pellets, after the manner of hawks: when full, like a dog, it hides what it cannot eat.

The young of the barn-owl are not easily raised, as they want a constant supply of fresh mice: whereas the young of the brown owl will eat indiscriminately all that is brought; snails, rats, kittens, puppies, magpies, and any kind of carrion or offal.

The house-martins have eggs still, and squab-young. The last swift I observed was about the twenty-first of *August;* it was a straggler.

Red-starts, fly-catchers, white-throats, and *reguli non cristati,* still appear; but I have seen no *black-caps* lately.

I forgot to mention that I once saw, in *Christ Church* college quadrangle in *Oxford,* on a very sunny warm morning, a *house-martin* flying about, and settling on the parapet, so late as the twentieth of *November.*

At present I know only two species of *bats,* the common *vespertilio murinus* and the *vespertilio auribus.*

I was much entertained last Summer with a tame bat, which would take flies out of a person's hand. If you gave it any thing to eat, it brought its wings round before the mouth, hovering and hiding its head in the manner of birds of prey when they feed. The adroitness it showed in shearing off the wings of the flies, which were always rejected, was worthy of observation, and pleased me

much. Insects seemed to be most acceptable, though it did not refuse raw flesh when offered: so that the notion, that bats go down chimnies and gnaw men's bacon, seems no improbable story. While I amused myself with this wonderful quadruped, I saw it several times confute the vulgar opinion, that bats when down on a flat surface cannot get on the wing again, by rising with great ease from the floor. It ran, I observed, with more dispatch than I was aware of; but in a most ridiculous and grotesque manner.

Bats drink on the wing, like swallows, by sipping the surface, as they play over pools and streams. They love to frequent waters, not only for the sake of drinking, but on account of insects, which are found over them in the greatest plenty. As I was going some years ago, pretty late, in a boat from *Richmond* to *Sunbury*, on a warm Summer's evening, I think I saw myriads of bats between the two places: the air swarmed with them all along the *Thames*, so that hundreds were in sight at a time.

I am, &c.

LETTER XII.

TO THE SAME.

SIR; November 4, 1767.

It gave me no small satisfaction to hear that the *falco** turned out an uncommon one. I must confess I should have been better pleased to have heard that I had sent you a bird that you had never seen before; but that, I find, would be a difficult task.

I have procured some of the mice mentioned in my former letters, a young one and a female with young, both of which I have preserved in brandy. From the colour, shape, size, and manner of nesting, I make no doubt but that the species is nondescript. They are much smaller, and more slender, than the *mus domesticus medius* of *Ray;* and have more of the squirrel or dormouse colour: their belly is white; a

* This hawk proved to be the *falco peregrinus;* a variety.

straight line along their sides divides the shades of their back and belly. They never enter into houses; are carried into ricks and barns with the sheaves; abound in harvest; and build their nests amidst the straws of the corn above the ground, and sometimes in thistles. They breed as many as eight at a litter, in a little round nest composed of the blades of grass or wheat.

One of these nests I procured this Autumn, most artificially platted, and composed of the blades of wheat; perfectly round, and about the size of a cricket-ball; with the aperture so ingeniously closed, that there was no discovering to what part it belonged. It was so compact and well filled, that it would roll across the table without being discomposed, though it contained eight little mice that were naked and blind. As this nest was perfectly full, how could the dam come at her litter respectively so as to administer a teat to each? Perhaps she opens different places for that purpose, adjusting them again when the business is over: but she could not possibly

be contained herself in the ball with her young, which moreover would be daily increasing in bulk. This wonderful procreant cradle, an elegant instance of the efforts of instinct, was found in a wheat-field suspended in the head of a thistle.

A gentleman, curious in birds, wrote me word that his servant had shot one last *January*, in that severe weather, which he believed would puzzle me. I called to see it this summer, not knowing what to expect: but, the moment I took it in hand, I pronounced it the male *garrulus bohemicus*, or *German* silk-tail, from the five peculiar crimson tags or points which it carries at the ends of five of the short remiges. It cannot, I suppose, with any propriety, be called an *English* bird: and yet I see by *Ray's Philosoph. Letters*, that great flocks of them, feeding on haws, appeared in this kingdom in the Winter of 1685.

The mention of haws puts me in mind that there is a total failure of that wild fruit, so conducive to the support of many of the winged nation. For the same severe wea-

ther, late in the Spring, which cut off all the produce of the more tender and curious trees, destroyed also that of the more hardy and common.

Some birds, haunting with the missel-thrushes, and feeding on the berries of the yew-tree, which answered to the description of the *merula torquata,* or *ring-ouzel,* were lately seen in this neighbourhood. I employed some people to procure me a specimen, but without success. See Letter VIII.

Query—Might not *Canary* birds be naturalized to this climate, provided their eggs were put, in the Spring, into the nests of some of their congeners, as goldfinches, greenfinches, &c.? Before Winter perhaps they might be hardened, and able to shift for themselves.

About ten years ago I used to spend some weeks yearly at *Sunbury,* which is one of those pleasant villages lying on the *Thames,* near *Hampton-court.* In the Autumn, I could not help being much amused with those myriads of the swallow kind which assemble in those parts. But what struck

me most was, that, from the time they began to congregate, forsaking the chimnies and houses, they roosted every night in the osier-beds of the aits of that river. Now this resorting towards that element, at that season of the year, seems to give some countenance to the northern opinion (strange as it is) of their retiring under water. A *Swedish* naturalist is so much persuaded of that fact, that he talks, in his calendar of *Flora*, as familiarly of the swallow's going under water in the beginning of *September*, as he would of his poultry going to roost a little before sunset.

An observing gentleman in *London* writes me word, that he saw an house-martin, on the twenty-third of last *October*, flying in and out of its nest in the *Borough*. And I myself, on the twenty-ninth of last *October* (as I was travelling through *Oxford)*, saw four or five swallows hovering round and settling on the roof of the county-hospital.

Now is it likely that these poor little birds (which perhaps had not been hatched but a few weeks) should, at that late season

of the year, and from so midland a county, attempt a voyage to *Goree* or *Senegal*, almost as far as the *equator*?*

I acquiesce entirely in your opinion—that, though most of the swallow kind may migrate, yet that some do stay behind and hide with us during the Winter.

As to the short-winged soft-billed birds, which come trooping in such numbers in the Spring, I am at a loss even what to suspect about them. I watched them narrowly this year, and saw them abound till about *Michaelmas*, when they appeared no longer. Subsist they cannot openly among us, and yet elude the eyes of the inquisitive: and, as to their hiding, no man pretends to have found any of them in a torpid state in the Winter. But with regard to their migration, what difficulties attend that supposition! that such feeble bad fliers (who the Summer long never flit but from hedge to hedge) should be able to traverse vast seas and continents, in order to enjoy milder seasons amidst the regions of *Africa*!

* See *Adamson's* Voyage to *Senegal*.

LETTER XIII.

TO THE SAME.

SIR; SELBORNE, Jan. 22, 1768.

As in one of your former letters you expressed the more satisfaction from my correspondence on account of my living in the most southerly county; so now I may return the compliment, and expect to have my curiosity gratified by your living much more to the North.

For many years past I have observed that towards *Christmas* vast flocks of chaffinches have appeared in the fields; many more, I used to think, than could be hatched in any one neighbourhood. But, when I came to observe them more narrowly, I was amazed to find that they seemed to me to be almost all hens. I communicated my suspicions to some intelligent neighbours, who, after taking pains about the matter, declared that they also thought them all mostly females;

at least fifty to one. This extraordinary occurrence brought to my mind the remark of *Linnæus;* that "before Winter all their "hen chaffinches migrate through *Holland* "into *Italy*." Now I want to know, from some curious person in the north, whether there are any large flocks of these finches with them in the Winter, and of which sex they mostly consist? For, from such intelligence, one might be able to judge whether our female flocks migrate from the other end of the island, or whether they come over to us from the continent.

We have, in the Winter, vast flocks of the common linnets; more, I think, than can be bred in any one district. These, I observe, when the Spring advances, assemble on some tree in the sunshine, and join all in a gentle sort of chirping, as if they were about to break up their winter quarters, and betake themselves to their proper summer homes. It is well known, at least, that the swallows and the fieldfares do congregate with a gentle twittering before they make their respective departure.

You may depend on it that the bunting, *emberiza miliaria,* does not leave this county in the Winter. In *January* 1767 I saw several dozen of them, in the midst of a severe frost, among the bushes on the downs near *Andover:* in our woodland inclosed district it is a rare bird.

Wagtails, both white and yellow, are with us all the Winter. Quails crowd to our southern coast, and are often killed in numbers by people that go on purpose.

Mr. *Stillingfleet,* in his Tracts, says that, "if the wheatear *(ænanthe)* does not quit "*England,* it certainly shifts places; for "about harvest they are not to be found, "where there was before great plenty of "them." This well accounts for the vast quantities that are caught about that time on the south downs near *Lewes,* where they are esteemed a delicacy. There have been shepherds, I have been credibly informed, that have made many pounds in a season by catching them in traps. And though such multitudes are taken, I never saw (and I am well acquainted with those parts)

above two or three at a time: for they are never gregarious. They may perhaps migrate in general; and, for that purpose, draw towards the coast of *Sussex* in Autumn: but that they do not all withdraw I am sure; because I see a few stragglers in many counties, at all times of the year, especially about warrens and stone quarries.

I have no acquaintance, at present, among the gentlemen of the navy: but have written to a friend, who was a sea-chaplain in the late war, desiring him to look into his minutes, with respect to birds that settled on their rigging during their voyage up or down the channel. What *Hasselquist* says on that subject is remarkable: there were little short-winged birds frequently coming on board his ship all the way from our channel quite up to the *Levant*, especially before squally weather.

What you suggest, with regard to *Spain*, is highly probable. The Winters of *Andalusia* are so mild, that, in all likelihood, the soft-billed birds that leave us at that

season may find insects sufficient to support them there.

Some young man, possessed of fortune, health, and leisure, should make an autumnal voyage into that kingdom; and should spend a year there, investigating the natural history of that vast country. Mr. *Willughby** passed through that kingdom on such an errand; but he seems to have skirted along in a superficial manner and an ill humour, being much disgusted at the rude dissolute manners of the people.

I have no friend left now at *Sunbury* to apply to about the swallows roosting on the aits of the *Thames:* nor can I hear any more about those birds which I suspected were *merulæ torquatæ.*

As to the small mice, I have farther to remark, that though they hang their nests for breeding up amidst the straws of the standing corn, above the ground, yet I find that, in the Winter, they burrow deep in the earth, and make warm beds of grass:

* See *Ray*'s Travels, p. 466.

but their grand rendezvous seems to be in corn ricks, into which they are carried at harvest. A neighbour housed an oat-rick lately, under the thatch of which were assembled near an hundred, most of which were taken; and some I saw. I measured them; and found that, from nose to tail, they were just two inches and a quarter, and their tails just two inches long. Two of them, in a scale, weighed down just one copper halfpenny, which is about the third of an ounce avoirdupois: so that I suppose they are the smallest quadrupeds in this island. A full-grown *mus medius domesticus* weighs, I find, one ounce lumping weight, which is more than six times as much as the mouse above; and measures from nose to rump four inches and a quarter, and the same in its tail. We have had a very severe frost and deep snow this month. My thermometer was one day fourteen degrees and a half below the freezing point, within doors. The tender evergreens were injured pretty much. It was very providential that the air was still, and the ground well

covered with snow, else vegetation in general must have suffered prodigiously. There is reason to believe that some days were more severe than any since the year 1739-40.

I am, &c. &c.

LETTER XIV.

TO THE SAME.

DEAR SIR; SELBORNE, March 12, 1768.

IF some curious gentleman would procure the head of a fallow deer, and have it dissected, he would find it furnished with two spiracula, or breathing-places, besides the nostrils; probably analogous to the *puncta lachrymalia* in the human head. When deer are thirsty they plunge their noses, like some horses, very deep under water while in the act of drinking, and continue them in that situation for a considerable time: but, to obviate any inconveniency,

they can open two vents, one at the inner corner of each eye, having a communication with the nose. Here seems to be an extraordinary provision of nature worthy our attention; and which has not, that I know of, been noticed by any naturalist. For it looks as if these creatures would not be suffocated, though both their mouths and nostrils were stopped. This curious formation of the head may be of singular service to beasts of chase, by affording them free respiration: and no doubt these additional nostrils are thrown open when they are hard run.* Mr. Ray observed that, at *Malta*, the owners slit up the nostrils of such asses as were hard worked: for they, being naturally straight or small, did

* In answer to this account, Mr. *Pennant* sent me the following curious and pertinent reply. "I was "much surprised to find in the *antelope* something ana-"logous to what you mention as so remarkable in deer. "This animal also has a long slit beneath each eye, "which can be opened and shut at pleasure. On holding "an orange to one, the creature made as much use of "those orifices as of his nostrils, applying them to the "fruit, and seeming to smell it through them."

not admit air sufficient to serve them when they travelled, or laboured in that hot climate. And we know that grooms, and gentlemen of the turf, think large nostrils necessary, and a perfection, in hunters and running horses.

Oppian, the *Greek* poet, by the following line, seems to have had some notion that stags have four spiracula:

" Τετραδυμοι ῥινες, τισυρες πνοιησι διαυλοι"
" Quadrifidæ nares, quadruplices ad respirationem
" canales."

Opp. Cyn. Lib. ii. 1. 181.

Writers copying from one another, make *Aristotle* say that goats breathe at their ears; whereas he asserts just the contrary:—
" Αλμκαιων γαρ ουκ αληθη λεγει, φαμενος ανάπνειν
" τας αιγας κατα τα ωτα." " *Alcmæon* does
" not advance what is true, when he avers
" that goats breathe through their ears."
History of animals. Book I. chap. xi.

LETTER XV.

TO THE SAME

DEAR SIR; SELBORNE, March 30, 1768.

SOME intelligent country people have a notion that we have, in these parts, a species of the *genus mustelinum*, besides the weasel, stoat, ferret, and polecat; a little reddish beast, not much bigger than a field mouse, but much longer, which they call a *cane*. This piece of intelligence can be little depended on; but farther inquiry may be made.

A gentleman in this neighbourhood had two milk-white rooks in one nest. A booby of a carter, finding them before they were able to fly, threw them down, and destroyed them, to the regret of the owner, who would have been glad to have preserved such a curiosity in his rookery. I saw the birds myself nailed against the end of a barn,

and was surprised to find that their bills, legs, feet, and claws were milk-white.

A shepherd saw, as he thought, some white larks on a down above my house this Winter: were not these the *emberiza nivalis*, the snow-flake of the *Brit. Zool.?* No doubt they were.

A few years ago I saw a cock bullfinch in a cage, which had been caught in the fields after it was come to its full colours. In about a year it began to look dingy; and, blackening every succeeding year, it became coal-black at the end of four. Its chief food was hempseed. Such influence has food on the colour of animals! The pied and mottled colours of domesticated animals are supposed to be owing to high, various, and unusual food.

I had remarked, for years, that the root of the cuckoo-pint *(arum)* was frequently scratched out of the dry banks of hedges, and eaten in severe snowy weather. After observing, with some exactness, myself, and getting others to do the same, we found it was the thrush kind that searched it out.

The root of the *arum* is remarkably warm and pungent.

Our flocks of female chaffinches have not yet forsaken us. The blackbirds and thrushes are very much thinned down by that fierce weather in *January*.

In the middle of *February* I discovered, in my tall hedges, a little bird that raised my curiosity; it was of that yellow-green colour that belongs to the *salicaria* kind, and, I think, was soft-billed. It was no *parus;* and was too long and too big for the gloden-crowned wren, appearing most like the largest willow-wren. It hung sometimes with its back downwards, but never continuing one moment in the same place. I shot at it, but it was so desultory that I missed my aim.

I wonder that the stone curlew, *charadrius oedicnemus,* should be mentioned by the writers as a rare bird; it abounds in all the campaign parts of *Hampshire* and *Sussex,* and breeds, I think, all the Summer, having young ones, I know, very late in the Autumn. Already they begin clamouring in

the evening. They cannot, I think, with any propriety, be called as they are by Mr. *Ray*, "*circa aquas versantes*;" for with us, by day at least, they haunt only the most dry, open, upland fields and sheep-walks, far removed from water: what they may do in the night I cannot say. Worms are their usual food, but they also eat toads and frogs.

I can show you some good specimens of my *new mice*. *Linnæus* perhaps would call the species *mus minimus*.

LETTER XVI.

TO THE SAME.

DEAR SIR; SELBORNE, April 18, 1768.

THE history of the stone curlew *charadrius oedicnemus*, is as follows. It lays its eggs, usually two, never more than three, on the bare ground, without any nest, in the field; so that the countryman, in stirring

his fallows, often destroys them. The young run immediately from the egg like partridges, &c. and are withdrawn to some flinty field by the dam, where they sculk among the stones, which are their best security; for their feathers are so exactly of the colour of our grey spotted flints, that the most exact observer, unless he catches the eye of the young bird, may be eluded. The eggs are short and round: of a dirty white, spotted with dark bloody blotches. Though I might not be able, just when I pleased, to procure you a bird, yet I could show you them almost any day; and any evening you may hear them round the village, for they make a clamour which may be heard a mile. *Oedicnemus* is a most apt and expressive name for them, since their legs seem swollen like those of a gouty man. After harvest I have shot them before the pointers in turnip-fields.

I make no doubt but there are three species of the *willow-wrens:* two I know perfectly; but have not been able yet to procure the third. No two birds can dif-

fer more in their notes, and that constantly, than those two that I am acquainted with; for the one has a joyous, easy, laughing note; the other a harsh loud chirp. The former is every way larger, and three quarters of an inch longer, and weighs two drams and a half; while the latter weighs but two: so the songster is one-fifth heavier than the chirper. The chirper (being the first Summer-bird of passage that is heard, the wryneck sometimes excepted) begins his two notes in the middle of *March*, and continues them through the Spring and Summer till the end of *August*, as appears by my journals. The legs of the larger of these two are flesh-coloured; of the less, black.

The *grasshopper-lark* began his sibilous note in my fields last *Saturday*. Nothing can be more amusing than the whisper of this little bird, which seems to be close by, though at an hundred yards distance; and, when close at your ear, is scarce any louder than when a great way off. Had I not been a little acquainted with insects, and

known that the grasshopper kind is not yet hatched, I should have hardly believed but that it had been a *locusta* whispering in the bushes. The country people laugh when you tell them that it is the note of a bird. It is a most artful creature, sculking in the thickest part of a bush; and will sing at a yard distance, provided it be concealed. I was obliged to get a person to go on the other side of the hedge where it haunted; and then it would run, creeping like a mouse before us for an hundred yards together, through the bottom of the thorns; yet it would not come into fair sight: but in a morning early, and when undisturbed, it sings on the top of a twig, gaping and shivering with its wings. Mr. *Ray* himself had no knowledge of this bird, but received his account from Mr. *Johnson*, who apparently confounds it with the *reguli non cristati*, from which it is very distinct. See *Ray's Philos. Letters*, p. 108.

The fly-catcher *(stoparola)* has not yet appeared: it usually breeds in my vine. The *redstart* begins to sing: its note is

short and imperfect, but is continued till about the middle of *June*. The *willow-wrens* (the smaller sort) are horrid pests in a garden, destroying the pease, cherries, currants, &c.; and are so tame that a gun will not scare them.

A List of the Summer Birds of Passage discovered in this neighbourhood, ranged somewhat in the Order in which they appear:

	Linnæi Nomina.
Smallest willow-wren,	*Motacilla trochilus:*
Wryneck,	*Jynx torquilla:*
House-swallow,	*Hirundo rustica:*
Martin,	*Hirundo urbica:*
Sand-martin,	*Hirundo riparia:*
Cuckoo,	*Cuculus canorus:*
Nightingale,	*Motacilla luscinia:*
Blackcap,	*Motacilla atricapilla:*
Whitethroat,	*Motacilla sylvia:*
Middle willow-wren,	*Motacilla trochilus:*
Swift,	*Hirundo apus:*
Stone curlew?	*Charadrius oedicnemus?*
Turtle-dove?	*Turtur aldrovandi?*
Grasshopper-lark,	*Alauda trivialis:*
Landrail,	*Rallus crex:*
Largest willow-wren,	*Motacilla trochilus:*
Redstart,	*Motacilla phœnicurus:*
Goatsucker, or fern-owl,	*Caprimulgus europæus:*
Fly-catcher,	*Muscicapa grisola.*

My countrymen talk much of a bird that makes a clatter with its bill against a dead bough, or some old pales, calling it a jar-bird. I procured one to be shot in the very fact; it proved to be the *sitta europæa (the nuthatch)*. Mr. *Ray* says that the less spotted *woodpecker* does the same. This noise may be heard a furlong or more.

Now is the only time to ascertain the short-winged Summer birds; for, when the leaf is out, there is no making any remarks on such a restless tribe; and, when once the young begin to appear, it is all confusion: there is no distinction of genus, species, or sex.

In breeding-time snipes play over the moors, piping and humming: they always hum as they are descending. Is not their hum ventriloquous like that of the turkey? Some suspect it is made by their wings.

This morning I saw the golden-crowned wren, whose crown glitters like burnished gold. It often hangs like a titmouse, with its back downwards.

Your's, &c. &c.

LETTER XVII.

TO THE SAME.

DEAR SIR; SELBORNE, June 18, 1768.

ON *Wednesday* last arrived your agreeable letter of *June* the 10th. It gives me great satisfaction to find that you pursue these studies still with such vigour, and are in such forwardness with regard to reptiles and fishes.

The reptiles, few as they are, I am not acquainted with, so well as I could wish, with regard to their natural history. There is a degree of dubiousness and obscurity attending the propagation of this class of animals, something analogous to that of the *cryptogamia* in the sexual system of plants: and the case is the same with regard to some of the fishes; as the eel, &c.

The method in which toads procreate and bring forth seems to be very much in the dark. Some authors say that they are

viviparous: and yet *Ray* classes them among his oviparous animals; and is silent with regard to the manner of their bringing forth. Perhaps they may be ἔσω μὲν ὠοτόκοι, ἔξω δὲ ζωοτόκοι, as is known to be the case with the viper.

The copulation of frogs (or at least the appearance of it; for *Swammerdam* proves that the male has no *penis intrans*) is notorious to every body: because we see them sticking upon each other's backs for a month together in the Spring: and yet I never saw, or read, of toads being observed in the same situation. It is strange that the matter with regard to the venom of toads has not been yet settled. That they are not noxious to some animals is plain: for ducks, buzzards, owls, stone curlews, and snakes, eat them, to my knowledge, with impunity. And I well remember the time, but was not eye-witness to the fact (though numbers of persons were), when a quack, at this village, ate a toad to make the country-people stare; afterwards he drank oil.

I have been informed also, from un-

doubted authority, that some ladies (ladies you will say of peculiar taste) took a fancy to a toad, which they nourished Summer after Summer, for many years, till he grew to a monstrous size, with the maggots which turn to flesh flies. The reptile used to come forth every evening from an hole under the garden-steps; and was taken up, after supper, on the table to be fed. But at last a tame raven, kenning him as he put forth his head, gave him such a severe stroke with his horny beak as put out one eye. After this accident the creature languished for some time and died.

I need not remind a gentleman of your extensive reading of the excellent account there is from Mr. *Derham*, in *Ray*'s Wisdom of God in the Creation (p. 365), concerning the migration of frogs from their breeding ponds. In this account he at once subverts that foolish opinion of their dropping from the clouds in rain; showing that it is from the grateful coolness and moisture of those showers that they are tempted to set out on their travels, which they defer till

those fall. Frogs are as yet in their tadpole state; but, in a few weeks, our lanes, paths, fields, will swarm for a few days with myriads of those emigrants, no larger than my little finger nail. *Swammerdam* gives a most accurate account of the method and situation in which the male impregnates the spawn of the female. How wonderful is the economy of Providence with regard to the limbs of so vile a reptile! While it is an *aquatic* it has a fish-like tail, and no legs: as soon as the legs sprout, the tail drops off as useless, and the animal betakes itself to the land!

Merret, I trust, is widely mistaken when he advances that the *rana arborea* is an *English* reptile; it abounds in *Germany* and *Switzerland*.

It is to be remembered that the *salamandra aquatica* of *Ray* (the water-newt or eft) will frequently bite at the angler's bait, and is often caught on his hook. I used to take it for granted that the *salamandra aquatica* was hatched, lived, and died, in the water. But *John Ellis*, Esq. F.R.S. (the

coralline *Ellis)* asserts, in a letter to the Royal Society, dated *June* the 5th, 1766, in his account of the *mud inguana,* an amphibious *bipes* from *South Carolina,* that the water-eft, or newt, is only the *larva* of the land-eft, as tadpoles are of frogs. Lest I should be suspected to misunderstand his meaning, I shall give it in his own words. Speaking of the *opercula* or coverings to the gills of the *mud inguana,* he proceeds to say that "The form of these pennated co-
"verings approaches very near to what I
"have some time ago observed in the *larva*
"or *aquatic* state of our *English lacerta,*
"known by the name of eft, or newt;
"which serve them for coverings to their
"gills, and for fins to swim with while in
"this state; and which they lose, as well
"as the fins of their tails, when they
"*change* their state and *become land ani-*
"*mals,* as I have observed, by keeping
"them alive for some time myself."

Linnæus, in his *Systema Naturæ,* hints at what Mr. *Ellis* advances more than once.

Providence has been so indulgent to us as to allow of but one venomous reptile of the serpent kind in these kingdoms, and that is the viper. As you propose the good of mankind to be an object of your publications, you will not omit to mention common salad-oil as a sovereign remedy against the bite of the viper. As to the blind worm (*anguis fragilis*, so called because it snaps in sunder with a small blow), I have found, on examination, that it is perfectly innocuous. A neighbouring yeoman (to whom I am indebted for some good hints) killed and opened a female viper about the twenty-seventh of *May:* he found her filled with a chain of eleven eggs, about the size of those of a blackbird; but none of them were advanced so far towards a state of maturity as to contain any rudiments of young. Though they are oviparous, yet they are viviparous also, hatching their young within their bellies, and then bringing them forth. Whereas snakes lay chains of eggs every Summer in my melon beds, in spite of all that my people can do to prevent

them; which eggs do not hatch till the Spring following, as I have often experienced. Several intelligent folks assure me that they have seen the viper open her mouth and admit her helpless young down her throat on sudden surprises, just as the female opossum does her brood into the pouch under her belly, upon the like emergencies; and yet the *London* viper-catchers insist on it, to Mr. *Barrington*, that no such thing ever happens. The serpent kind eat, I believe, but once in a year; or, rather, but only just at one season of the year. Country people talk much of a water-snake, but, I am pretty sure, without any reason; for the common snake *(coluber natrix)* delights much to sport in the water, perhaps with a view to procure frogs and other food.

I cannot well guess how you are to make out your twelve species of reptiles, unless it be by the various species, or rather varieties, of our *lacerti*, of which *Ray* enumerates five. I have not had opportunity of ascertaining these; but remember well to

have seen, formerly, several beautiful green *lacerti* on the sunny sandbanks near *Farnham,* in *Surrey;* and *Ray* admits there are such in *Ireland.*

LETTER XVIII.

TO THE SAME.

DEAR SIR; SELBORNE, July 27, 1768.

I RECEIVED your obliging and communicative letter of *June* the 28th, while I was on a visit at a gentleman's house, where I had neither books to turn to, nor leisure to sit down, to return you an answer to many queries, which I wanted to resolve in the best manner that I am able.

A person, by my order, has searched our brooks, but could find no such fish as the *gasterosteus pungitius:* he found the *gasterosteus aculeatus* in plenty. This morning, in a basket, I packed a little earthen pot full of wet moss, and in it some sticklebacks,

male and female; the females big with spawn: some lamperns; some bulls heads; but I could procure no minnows. This basket will be in *Fleet-street* by eight this evening; so I hope *Mazel* will have them fresh and fair to-morrow morning. I gave some directions, in a letter, to what particulars the engraver should be attentive.

Finding, while I was on a visit, that I was within a reasonable distance of *Ambresbury,* I sent a servant over to that town, and procured several living specimens of loaches, which he brought, safe and brisk, in a glass decanter. They were taken in the gullies that were cut for watering the meadows. From these fishes (which measured from two to four inches in length) I took the following description: "The "loach, in its general aspect, has a pel- "lucid appearance: its back is mottled "with irregular collections of small black "dots, not reaching much below the *linea* "*lateralis,* as are the back and tail fins: a "black line runs from each eye down to "the nose; its belly is of a silvery white;

" the upper jaw projects beyond the lower,
" and is surrounded with six feelers, three
" on each side: its pectoral fins are large,
" its ventral much smaller; the fin behind
" its anus small; its dorsal fin large, con-
" taining eight spines; its tail, where it
" joins to the tail-fin, *remarkably broad*,
" without any taperness, so as to be cha-
" racteristic of this genus: the tail-fin is
" broad, and square at the end. From the
" breadth and muscular strength of the tail
" it appears to be an active nimble fish."

In my visit I was not very far from *Hungerford*, and did not forget to make some inquiries concerning the wonderful method of curing cancers by means of toads. Several intelligent persons, both gentry and clergy, do, I find, give a great deal of credit to what was asserted in the papers: and I myself dined with a Clergyman who seemed to be persuaded that what is related is matter of fact: but, when I came to attend to his account, I thought I discerned circumstances which did not a little invalidate the woman's story of the

manner in which she came by her skill. She says of herself, "that, labouring under "a virulent cancer, she went to some church "where there was a vast crowd: on going "into a pew, she was accosted by a strange "clergyman; who, after expressing com-"passion for her situation, told her that if "she would make such an application of "living toads as is mentioned she would be "well." Now is it likely that this unknown gentleman should express so much tenderness for this single sufferer, and not feel any for the many thousands that daily languish under this terrible disorder? Would he not have made use of this invaluable nostrum for his own emolument; or, at least, by some means of publication or other, have found a method of making it public for the good of mankind? In short, this woman (as it appears to me) having set up for a cancer-doctress, finds it expedient to amuse the country with this dark and mysterious relation.

The water-eft has not, that I can discern, the least appearance of any gills; for want

of which it is continually rising to the surface of the water to take in fresh air. I opened a big-bellied one indeed, and found it full of spawn. Not that this circumstance at all invalidates the assertion that they are *larvæ*: for the *larvæ* of insects are full of eggs, which they exclude the instant they enter their last state. The water-eft is continually climbing over the brims of the vessel, within which we keep it in water, and wandering away: and people every Summer see numbers crawling out of the pools where they are hatched, up the dry banks. There are varieties of them, differing in colour; and some have fins up their tail and back, and some have not.

LETTER XIX.

TO THE SAME.

DEAR SIR; SELBORNE, Aug. 17, 1768.

I HAVE now, past dispute, made out three distinct species of the willow-wrens (*motacillæ trochili*) which *constantly* and *invariably* use distinct notes. But, at the same time, I am obliged to confess that I know nothing of your willow-lark.* In my letter of *April* the 18th, I had told you peremptorily that I knew your willow-lark, but had not seen it then: but, when I came to procure it, it proved, in all respects, a very *motacilla trochilus;* only that it is a size larger than the two other, and the yellow-green of the whole upper part of the body is more vivid, and the belly of a clearer white. I have specimens of the three sorts now lying before me; and can discern that there are three gradations of

* Brit. Zool. edit. 1776, octavo, p. 381.

sizes, and that the least has black legs and the other two flesh-coloured ones. The yellowest bird is considerably the largest, and has its quill-feathers and secondary feathers tipped with white, which the others have not. This last haunts only the tops of trees in high beechen woods, and makes a sibilous grasshopper-like noise, now and then, at short intervals shivering a little with its wings when it sings; and is, I make no doubt now, the *regulus non cristatus* of *Ray*; which he says "*cantat voce stridulâ locustæ.*" Yet this great ornithologist never suspected that there were three species.

LETTER XX.

TO THE SAME.

DEAR SIR; SELBORNE, Oct. 8, 1768.

IT is, I find, in *zoology* as it is in *botany*: all nature is so full, that that district pro-

duces the greatest variety which is the most examined. Several birds, which are said to belong to the north only, are, it seems, often in the south. I have discovered this Summer three species of birds with us, which writers mention as only to be seen in the northern counties. The first that was brought me (on the 14th of *May)*, was the sandpiper, *tringa hypoleucus:* it was a cock bird, and haunted the banks of some ponds near the village; and, as it had a companion, doubtless intended to have bred near that water. Besides, the owner has told me since, that, on recollection, he has seen some of the same birds round his ponds in former Summers.

The next bird that I procured (on the 21st of *May)* was a male red-backed butcher bird, *lanius collurio.* My neighbour, who shot it, says that it might easily have escaped his notice, had not the outcries and chattering of the white-throats and other small birds drawn his attention to the bush where it was: its craw was filled with the legs and wings of beetles.

The next rare birds (which were procured for me last week) were some ring-ousels, *turdi torquati*.

This week twelve months a gentleman from *London*, being with us, was amusing himself with a gun, and found, he told us, on an old yew edge where there were berries, some birds like blackbirds, with rings of white round their necks: a neighbouring farmer also at the same time observed the same; but, as no specimens were procured, little notice was taken. I mentioned this circumstance to you in my letter of *November* the 4th, 1767: (you however paid but small regard to what I said, as I had not seen these birds myself:) but last week the aforesaid farmer, seeing a large flock, twenty or thirty of these birds, shot two cocks and two hens: and says, on recollection, that he remembers to have observed these birds again last Spring, about *Lady-day*, as it were, on their return to the north. Now perhaps these ousels are not the ousels of the north of *England*, but belong to the more northern parts of *Europe*;

and may retire before the excessive rigor of the frosts in those parts; and return to breed in the Spring, when the cold abates. If this be the case, here is discovered a new bird of Winter passage, concerning whose migrations the writers are silent: but if these birds should prove the ousels of the north of *England*, then here is a migration disclosed within our own kingdom never before remarked. It does not yet appear whether they retire beyond the bounds of our island to the south; but it is most probable that they usually do, or else one cannot suppose that they would have continued so long unnoticed in the southern counties. The ousel is larger than a blackbird, and feeds on haws; but last Autumn (when there were no haws) it fed on yew-berries: in the Spring it feeds on ivy-berries, which ripen only at that season, in *March* and *April*.

I must not omit to tell you (as you have been so lately on the study of reptiles) that my people, every now and then, of late, draw up with a bucket of water from my

well, which is 63 feet deep, a large black warty lizard with a fin-tail and yellow belly. How they first came down at that depth, and how they were ever to have got out thence without help, is more than I am able to say.

My thanks are due to you for your trouble and care in the examination of a buck's head. As far as your discoveries reach at present, they seem much to corroborate my suspicions; and I hope Mr. —— may find reason to give his decision in my favour; and then, I think, we may advance this extraordinary provision of nature as a new instance of the wisdom of God in the creation.

As yet I am not quite done with my history of the *oedicnemus*, or stone-curlew; for I shall desire a gentleman in *Sussex* (near whose house these birds congregate in vast flocks in the Autumn) to observe nicely when they leave him, (if they do leave him) and when they return again in the Spring: I was with this gentleman lately, and saw several single birds.

LETTER XXI.

TO THE SAME.

DEAR SIR; SELBORNE, Nov. 28, 1768.

WITH regard to the *oedicnemus*, or stone-curlew, I intend to write very soon to my friend near *Chichester*, in whose neighbourhood these birds seem most to abound; and shall urge him to take particular notice when they begin to congregate, and afterward to watch them most narrowly whether they do not withdraw themselves during the dead of the Winter. When I have obtained information with respect to this circumstance, I shall have finished my history of the *stone-curlew*; which I hope will prove to your satisfaction, as it will be, I trust, very near the truth. This gentleman, as he occupies a large farm of his own, and is abroad early and late, will be a very proper spy upon the motions of these birds: and besides, as I have prevailed on him to

buy the Naturalist's Journal (with which he is much delighted), I shall expect that he will be very exact in his dates. It is very extraordinary, as you observe, that a bird so common with us should never straggle to you.

And here will be the properest place to mention, while I think of it, an anecdote which the above mentioned gentleman told me when I was last at is house; which was, that in a warren joining to his outlet, many daws *(corvi monedulæ)* build every year in the rabbit burrows under-ground. The way he and his brothers used to take their nests, while they were boys, was by listening at the mouths of the holes; and, if they heard the young ones cry, they twisted the nest out with a forked stick. Some water-fowls *(viz.* the puffins) breed, I know, in that manner; but I should never have suspected the daws of building in holes on the flat ground.

Another very unlikely spot is made use of by daws as a place to breed in, and that is *Stonehenge.* These birds deposit their

nests in the interstices between the upright and the impost stones of that amazing work of antiquity: which circumstance alone speaks the prodigious height of the upright stones, that they should be tall enough to secure those nests from the annoyance of shepherd-boys, who are always idling round that place.

One of my neighbours last *Saturday, November* the 26th, saw a martin in a sheltered bottom: the sun shone warm, and the bird was hawking briskly after flies. I am now perfectly satisfied that they do not all leave this island in the Winter.

You judge very right, I think, in speaking with reserve and caution concerning the cures done by toads: for, let people advance what they will on such subjects, yet there is such a propensity in mankind towards deceiving and being deceived, that one cannot safely relate any thing from common report, especially in print, without expressing some degree of doubt and suspicion.

Your approbation, with regard to my

new discovery of the migration of the ring-ousel, gives me satisfaction; and I find you concur with me in suspecting that they are foreign birds which visit us. You will be sure, I hope, not to omit to make inquiry whether your ring-ousels leave your rocks in the Autumn. What puzzles me most, is the very short stay they make with us; for in about three weeks they are all gone. I shall be very curious to remark whether they will call on us at their return in the Spring, as they did last year.

I want to be better informed with regard to icthyology. If fortune had settled me near the sea-side, or near some great river, my natural propensity would soon have urged me to have made myself acquainted with their productions: but as I have lived mostly in inland parts, and in an upland district, my knowledge of fishes extends little farther than to those common sorts which our brooks and lakes produce.

I am, &c.

LETTER XXII.

TO THE SAME.

DEAR SIR; SELBORNE, Jan. 2, 1769.

As to the peculiarity of jackdaws building with us under the ground in rabbit-burrows, you have, in part, hit upon the reason; for, in reality, there are hardly any towers or steeples in all this country. And perhaps, *Norfolk* excepted, *Hampshire* and *Sussex* are as meanly furnished with churches as almost any counties in the kingdom. We have many livings of two or three hundred pounds a-year whose houses of worship make little better appearance than dovecots. When I first saw *Northamptonshire, Cambridgeshire,* and *Huntingdonshire,* and the fens of *Lincolnshire,* I was amazed at the number of spires which presented themselves in every point of view. As an admirer of prospects, I have reason to lament

this want in my own country; for such objects are very necessary ingredients in an elegant landscape.

What you mention with respect to reclaimed toads raises my curiosity. An ancient author, though no naturalist, has well remarked that "*Every kind of beasts, "and of birds, and of serpents, and things "in the sea, is tamed, and hath been tamed, "of mankind.*"*

It is a satisfaction to me to find that a green lizard has actually been procured for you in *Devonshire;* because it corroborates my discovery, which I made many years ago, of the same sort, on a sunny sandbank near *Farnham,* in *Surrey.* I am well acquainted with the south hams of *Devonshire;* and can suppose that district, from its southerly situation, to be a proper habitation for such animals in their best colours.

Since the ring-ousels of your vast mountains do certainly not forsake them against Winter, our suspicions that those which visit

* *James,* chap. iii. 7.

this neighbourhood about *Michaelmas* are not *English* birds, but driven from the more northern parts of *Europe* by the frosts, are still more reasonable; and it will be worth your pains to endeavour to trace from whence they come, and to inquire why they make so very short a stay.

In your account of your error with regard to the two species of herons, you incidentally gave me great entertainment in your description of the heronry at *Cressi-hall;* which is a curiosity I never could manage to see. Forescore nests of such a bird on one tree is a rarity which I would ride half as many miles to have a sight of. Pray be sure to tell me in your next whose seat *Cressi-hall* is, and near what town it lies.* I have often thought that those vast extents of fens have never been sufficiently explored. If half a dozen gentlemen, furnished with a good strength of water-spaniels, were to beat them over for a week, they would certainly find more species.

There is no bird, I believe, whose man-

* *Cressi-hall* is near *Spalding*, in *Lincolnshire*.

ners I have studied more than that of the *caprimulgus* (the goat-sucker), as it is a wonderful and curious creature: but I have always found that though sometimes it may chatter as it flies, as I know it does, yet in general it utters its jarring note sitting on a bough: and I have for many an half hour watched it as it sat with its under mandible quivering, and particularly this Summer. It perches usually on a bare twig, with its head lower than its tail, in an attitude well expressed by your draughtsman in the folio *British Zoology*. This bird is most punctual in beginning its song exactly at the close of day; so exactly that I have known it strike up more than once or twice just at the report of the *Portsmouth* evening gun, which we can hear when the weather is still. It appears to me past all doubt that its notes are formed by organic impulse, by the powers of the parts of its windpipe, formed for sound, just as cats pur. You will credit me, I hope, when I assure you that, as my neighbours were assembled in an hermitage on the side of a steep hill

where we drink tea, one of these churn-owls came and settled on the cross of that little straw edifice and began to chatter, and continued his note for many minutes; and we were all struck with wonder to find that the organs of that little animal, when put in motion, gave a sensible vibration to the whole building! This bird also sometimes makes a small squeak, repeated four or five times; and I have observed that to happen when the cock has been pursuing the hen in a toying manner through the boughs of a tree.

It would not be at all strange if your bat, which you have procured, should prove a new one, since five species have been found in a neighbouring kingdom. The great sort that I mentioned is certainly a non-descript: I saw but one this Summer, and that I had no opportunity of taking.

Your account of the *Indian-grass* was entertaining. I am no angler myself; but inquiring of those that are, what they supposed that part of their tackle to be made

of? they replied "of the intestines of a "silkworm."

Though I must not pretend to great skill in entomology, yet I cannot say that I am ignorant of that kind of knowledge: I may now and then perhaps be able to furnish you with a little information.

The vast rains ceased with us much about the same time as with you, and since we have had delicate weather. Mr. *Barker*, who has measured the rain for more than thirty years, says, in a late letter, that more rain has fallen this year than in any he ever attended to; though, from *July* 1763 to *January* 1764, more fell than in any seven months of this year.

LETTER XXIII.

TO THE SAME.

DEAR SIR; SELBORNE, Feb. 28, 1769.

IT is not improbable that the *Guernsey* lizard and our green lizards may be specifically the same; all that I know is, that, when some years ago many *Guernsey* lizards were turned loose in *Pembroke* college garden, in the university of *Oxford*, they lived a great while, and seemed to enjoy themselves very well, but never bred. Whether this circumstance will prove any thing either way I shall not pretend to say.

I return you thanks for your account of *Cressi-hall*; but recollect, not without regret, that in *June* 1746 I was visiting for a week together at *Spalding*, without ever being told that such a curiosity was just at

hand. Pray send me word in your next what sort of tree it is that contains such a quantity of herons' nests; and whether the heronry consist of a whole grove or wood, or only of a few trees.

It gave me satisfaction to find we accorded so well about the *caprimulgus:* all I contended for was to prove that it often chatters sitting as well as flying; and therefore the noise was voluntary, and from organic impulse, and not from the resistance of the air against the hollow of its mouth and throat.

If ever I saw any thing like actual migration, it was last *Michaelmas-day.* I was travelling, and out early in the morning: at first there was a vast fog; but, by the time that I was got seven or eight miles from home towards the coast, the sun broke out into a delicate warm day. We were then on a large heath or common, and I could discern, as the mist began to break away, great numbers of swallows *(hirundines rusticæ)* clustering on the stunted shrubs and bushes, as if they had roosted

there all night. As soon as the air became clear and pleasant they all were on the wing at once; and, by a placid and easy flight, proceeded on southward towards the sea: after this I did not see any more flocks, only now and then a straggler.

I cannot agree with those persons that assert that the swallow kind disappear some and some gradually, as they come, for the bulk of them seem to withdraw at once: only some stragglers stay behind a long while, and do never, there is the greatest reason to believe, leave this island. Swallows seem to lay themselves up, and to come forth in a warm day, as bats do continually of a warm evening, after they have disappeared for weeks. For a very respectable gentleman assured me that, as he was walking with some friends under *Merton-wall* on a remarkably hot noon, either in the last week in *December* or the first week in *January*, he espied three or four swallows huddled together on the moulding of one of the windows of that college. I have frequently remarked that swallows are seen

later at *Oxford* than elsewhere: is it owing to the vast massy buildings of that place, to the many waters round it, or to what else?

When I used to rise in a morning last Autumn, and see the swallows and martins clustering on the chimnies and thatch of the neighbouring cottages, I could not help being touched with a secret delight, mixed with some degree of mortification: with delight to observe with how much ardour and punctuality those poor little birds obeyed the strong impulse towards migration, or hiding, imprinted on their minds by their great Creator; and with some degree of mortification, when I reflected that, after all our pains and inquiries, we are yet not quite certain to what regions they do migrate; and are still farther embarrassed to find that some do not actually migrate at all.

These reflections made so strong an impression on my imagination, that they became productive of a composition that

may perhaps amuse you for a quarter of an hour when next I have the honour of writing to you.

LETTER XXIV.

TO THE SAME.

DEAR SIR; SELBORNE, May 29, 1769.

THE *scarabæus fullo* I know very well, having seen it in collections; but have never been able to discover one wild in its natural state. Mr. *Banks* told me he thought it might be found on the sea-coast.

On the thirteenth of *April*, I went to the sheep-down, where the *ring-ousels* have been observed to make their appearance at spring and fall, in their way perhaps to the north or south; and was much pleased to see three birds about the usual spot. We shot a cock and a hen; they were plump and in high condition. The hen had but very

small rudiments of eggs within her, which proves they are late breeders; whereas those species of the thrush kind that remain with us the whole year have fledged young before that time. In their crops was nothing very distinguishable, but somewhat that seemed like blades of vegetables nearly digested. In Autumn they feed on haws and yew-berries, and in the Spring on ivy-berries. I dressed one of these birds, and found it juicy and well-flavoured. It is remarkable that they make but a few days stay in their Spring visit, but rest near a fortnight at *Michaelmas*. These birds, from the observations of three Springs and two Autumns, are most punctual in their return; and exhibit a new migration unnoticed by the writers, who supposed they never were to be seen in any of the southern counties.

One of my neighbours lately brought me a new *salicaria*, which, at first, I suspected might have proved your willow-lark,* but on a nicer examination, it answered much better to the description of that species

* For this *salicaria* see letter *August* 30, 1769.

which you shot at *Revesby*, in *Lincolnshire*. My bird I describe thus: "It is a size less "than the grasshopper-lark; the head, "back, and coverts of the wings, of a dusky "brown without those dark spots of the "grasshopper-lark; over each eye is a "milkwhite stroke; the chin and throat "are white, and the under parts of a yel-"lowish white; the rump is tawny, and "the feathers of the tail sharp-pointed; the "bill is dusky and sharp, and the legs are "dusky; the hinder claw long and crooked." The person that shot it says that it sung so like a reed-sparrow that he took it for one; and that it sings all night: but this account merits farther inquiry. For my part, I suspect it is a second sort of *locustella*, hinted at by Dr. *Derham* in *Ray's Letters:* see p. 108. He also procured me a grasshopper-lark.

The question that you put with regard to those genera of animals that are peculiar to *America*, viz. how they came there, and whence? is too puzzling for me to answer; and yet so obvious as often to have struck

me with wonder. If one looks into the writers on that subject little satisfaction is to be found. Ingenious men will readily advance plausible arguments to support whatever theory they shall choose to maintain; but then the misfortune is, every one's hypothesis is each as good as another's, since they are all founded on conjecture. The late writers of this sort, in whom may be seen all the arguments of those that have gone before, as I remember, stock *America* from the western coast of *Africa*, and the south of *Europe*; and then break down the Isthmus that bridged over the *Atlantic*. But this is making use of a violent piece of machinery: it is a difficulty worthy of the interposition of a god! "*Incredulus odi.*"

TO THOMAS PENNANT, ESQUIRE.

THE NATURALIST'S SUMMER-EVENING WALK.

——equidem credo, quia sit divinitus illis
Ingenium VIRG. GEORG.

WHEN day declining sheds a milder gleam,
What time the May-fly* haunts the pool or stream;
When the still owl skims round the grassy mead,
What time the timorous hare limps forth to feed;
Then be the time to steal adown the vale,
And listen to the vagrant cuckoo's† tale;
To hear the clamorous curlew‡ call his mate,
Or the soft quail his tender pain relate;

* The angler's May-fly, the *ephemera vulgata Linn.* comes forth from its aurelia state, and emerges out of the water about six in the evening, and dies about eleven at night, determining the date of its fly state in about five or six hours. They usually begin to appear about the 4th of *June*, and continue in succession for near a fortnight. See *Swammerdam, Derham, Scopoli, &c.*

† Vagrant cuckoo; so called because, being tied down by no incubation or attendance about the nutrition of its young, it wanders without control.

‡ *Charadrius Oedicnemus.*

To see the swallow sweep the dark'ning plain
Belated, to support her infant train;
To mark the swift in rapid giddy ring
Dash round the steeple, unsubdu'd of wing:
Amusive birds! say where your hid retreat
When the frost rages and the tempests beat;
Whence your return, by such nice instinct led,
When Spring, soft season, lifts her bloomy head?
Such baffled searches mock man's prying pride,
The GOD of NATURE is your secret guide!

While deep'ning shades obscure the face of day
To yonder bench leaf-shelter'd let us stray,
'Till blended objects fail the swimming sight,
And all the fading landscape sinks in night;
To hear the drowsy dorr come brushing by
With buzzing wing, or the shrill cricket* cry;
To see the feeding bat glance through the wood;
To catch the distant falling of the flood;
While o'er the cliff th' awaken'd churn-owl hung
Through the still gloom protracts his chattering song;
While high in air, and pois'd upon his wings,
Unseen, the soft enamour'd woodlark† sings:
These, NATURE's works, the curious mind employ,
Inspire a soothing melancholy joy:

* *Gryllus campestris.*

† In hot summer nights woodlarks soar to a prodigious height, and hang singing in the air.

As fancy warms, a pleasing kind of pain
Steals o'er the cheek, and thrills the creeping vain!
Each rural sight, each sound, each smell combine;
The tinkling sheep-bell, or the breath of kine;
The new-mown hay that scents the swelling breeze,
Or cottage-chimney smoking through the trees.
The chilling night-dews fall:—away, retire;
For see, the glow-worm lights her amorous fire!*
Thus, ere night's veil had half obscur'd the sky,
Th' impatient damsel hung her lamp on high:
True to the signal, by love's meteor led,
Leander hastened to his Hero's bed.†

I am, &c.

* The light of the female glow-worm (as she often crawls up the stalk of a grass to make herself more conspicuous) is a signal to the male, which is a slender dusky *scarabæus*.

† See the story of *Hero* and *Leander*.

LETTER XXV.

TO THE SAME.

DEAR SIR; SELBORNE, Aug. 30, 1769.

IT gives me satisfaction to find that my account of the *ousel migration* pleases you. You put a very shrewd question when you ask me how I know that their autumnal migration is southward? Was not candour and openness the very life of natural history, I should pass over this query just as a sly commentator does over a crabbed passage in a classic; but common ingenuousness obliges me to confess, not without some degree of shame, that I only reasoned in that case from analogy. For as all other autumnal birds migrate from the northward to us, to partake of our milder Winters, and return to the northward again when the rigorous cold abates, so I concluded that the ring-ousels did the same, as well as their congeners the fieldfares; and

especially as ring-ousels are known to haunt cold mountainous countries: but I have good reason to suspect since, that they may come to us from the westward; because I hear from very good authority, that they breed on *Dartmoor:* and that they forsake that wild district about the time that our visitors appear, and do not return till late in the Spring.

I have taken a great deal of pains about your *salicaria* and mine, with a white stroke over its eye and a tawny rump. I have surveyed it alive and dead, and have procured several specimens; and am perfectly persuaded myself (and trust you will soon be convinced of the same) that it is no more nor less than the *passer arundinaceus minor* of *Ray.* This bird, by some means or other, seems to be entirely omitted in the *British Zoology;* and one reason probably was; because it is so strangely classed in *Ray,* who ranges it among his *picis affines.* It ought no doubt to have gone among his *aviculæ caudâ unicolore,* and among your slender-billed small birds of the same divi-

sion. *Linnæus* might with great propriety have put it into his genus of *motacilla;* and the *motacilla salicaria* of his *fauna suecica* seems to come the nearest to it. It is no uncommon bird, haunting the sides of ponds and rivers where there is covert, and the reeds and sedges of moors. The country people in some places call it the *sedge-bird.* It sings incessantly night and day during the breeding time, imitating the note of a sparrow, a swallow, a sky-lark; and has a strange hurrying manner in its song. My specimens correspond most minutely to the description of your *fen-salicaria* shot near *Revesby.* Mr. *Ray* has given an excellent characteristic of it when he says, "*Rostrum & pedes in hâc aviculâ multò* "*majores sunt quàm pro corporis ratione.*" See letter *May* 29, 1769.

I have got you the egg of an *oedicnemus,* or stone-curlew, which was picked up in a fallow on the naked ground: there were two; but the finder inadvertently crushed one with his foot before he saw them.

When I wrote to you last year on rep-

tiles, I wish I had not forgot to mention the faculty that snakes have of stinking *se defendendo*. I knew a gentleman who kept a tame snake, which was in its person as sweet as any animal while in good humour and unalarmed; but as soon as a stranger, or a dog or cat, came in, it fell to hissing, and filled the room with such nauseous effluvia as rendered it hardly supportable. Thus the squnck, or stonck, of *Ray's Synop. Quadr.* is an innocuous and sweet animal; but, when pressed hard by dogs and men, it can eject such a most pestilent and fetid smell and excrement, that nothing can be more horrible.

A gentleman sent me lately a fine specimen of the *lanius minor cinerascens cum maculâ in scapulis albâ, Raii;* which is a bird that, at the time of your publishing your two first volumes of *British Zoology*, I find you had not seen. You have described it well from *Edwards*'s drawing.

LETTER XXVI.

TO THE SAME.

DEAR SIR; SELBORNE, Dec. 8, 1769.

I WAS much gratified by your communicative letter on your return from *Scotland*, where you spent, I find, some considerable time, and gave yourself good room to examine the natural curiosities of that extensive kingdom, both those of the islands, as well as those of the highlands. The usual bane of such expeditions is hurry! because men seldom allot themselves half the time they should do; but, fixing on a day for their return, post from place to place, rather as if they were on a journey that required dispatch, than as philosophers investigating the works of nature. You must have made, no doubt, many discoveries, and laid up a good fund of materials for a future edition of the *British Zoology* and will

have no reason to repent that you have bestowed so much pains on a part of *Great Britain* that perhaps was never so well examined before.

It has always been matter of wonder to me that fieldfares, which are so congenerous to thrushes and blackbirds, should never choose to breed in *England:* but that they should not think even the highlands cold and northerly, and sequestered enough, is a circumstance still more strange and wonderful. The ring-ousel, you find, stays in *Scotland* the whole year round; so that we have reason to conclude that those migrators that visit us for a short space every Autumn do not come from thence.

And here, I think, will be the proper place to mention that those birds were most punctual again in their migration this Autumn, appearing, as before, about the 30th of *September:* but their flocks were larger than common, and their stay protracted somewhat beyond the usual time. If they came to spend the whole Winter with us, as some of their congeners do, and then left

us, as they do, in Spring, I should not be so much struck with the occurrence, since it would be similar to that of the other Winter birds of passage; but when I see them for a fortnight at *Michaelmas*, and again for about a week in the middle of *April*, I am seized with wonder, and long to be informed whence these travellers come, and whither they go, since they seem to use our hills merely as an inn or baiting place.

Your account of the greater brambling, or snow-fleck, is very amusing; and strange it is, that such a short-winged bird should delight in such perilous voyages over the northern ocean! Some country people in the Winter time have every now and then told me that they have seen two or three white larks on our downs; but, on considering the matter, I begin to suspect that these are some stragglers of the birds we are talking of, which sometimes perhaps may rove so far to the southward.

It pleases me to find that white hares are so frequent on the *Scottish* mountains, and especially as you inform me that it is a

distinct species; for the quadrupeds of *Britain* are so few, that every new species is a great acquisition.

The eagle-owl, could it be proved to belong to us, is so majestic a bird, that it would grace our *fauna* much. I never was informed before where wild-geese are known to breed.

You admit, I find, that I have proved your *fen-salicaria* to be the lesser reed-sparrow of *Ray:* and I think you may be secure that I am right; for I took very particular pains to clear up that matter, and had some fair specimens; but, as they were not well preserved, they are decayed already. You will, no doubt, insert it in its proper place in your next edition. Your additional plates will much improve your work.

De Buffon, I know, has described the water shrew-mouse: but still I am pleased to find you have discovered it in *Lincolnshire,* for the reason I have given in the article of the white hare.

As a neighbour was lately ploughing in a dry chalky field, far removed from any

water, he turned out a water-rat, that was curiously laid up in an *hybernaculum* artificially formed of grass and leaves. At one end of the *burrow* lay above a gallon of potatoes regularly stowed, on which it was to have supported itself for the Winter. But the difficulty with me is how this *amphibius mus* came to fix its Winter station at such a distance from the water. Was it determined in its choice of that place by the mere accident of finding the potatoes which were planted there; or is it the constant practice of the aquatic-rat to forsake the neighbourhood of the water in the colder months?

Though I delight very little in analogous reasoning, knowing how fallacious it is with respect to natural history; yet, in the following instance, I cannot help being inclined to think it may conduce towards the explanation of a difficulty that I have mentioned before, with respect to the invariable early retreat of the *hirundo apus*, or swift, so many weeks before its congeners: and that not only with us, but also in *Andalusia*,

where they also begin to retire about the beginning of *August.*

The great large bat* (which by the by is at present a non-descript in *England,* and what I have never been able yet to procure) retires or migrates very early in the Summer: it also ranges very high for its food, feeding in a different region of the air; and that is the reason I never could procure one. Now this is exactly the case with the swifts; for they take their food in a more exalted region than the other species, and are very seldom seen hawking for flies near the ground, or over the surface of the water. From hence I would conclude that these *hirundines,* and the larger bats, are supported by some sorts of high-flying gnats, scarabs, or *phalænæ,* that are of short continuance; and that the short stay of these strangers is regulated by the defect of their food.

* The little bat appears almost every month in the year; but I have never seen the large ones till the end of *April,* nor after *July.* They are most common in *June,* but never in any plenty: are a rare species with us.

By my journal it appears that curlews clamoured on to *October* the thirty-first; since which, I have not seen or heard any. Swallows were observed on to *November* the third.

LETTER XXVII.

TO THE SAME.

DEAR SIR; SELBORNE, Feb. 22, 1770.

HEDGE-HOGS abound in my gardens and fields. The manner in which they eat the roots of the plantain in my grass-walk is very curious: with their upper mandible, which is much longer than their lower, they bore under the plant, and so eat the root off upwards, leaving the tuft of leaves untouched. In this respect they are serviceable, as they destroy a very troublesome weed; but they deface the walks in some measure by digging little round holes. It appears, by the dung that they drop upon

the turf, that beetles are no inconsiderable part of their food. In *June* last I procured a litter of four or five young hedge-hogs, which appeared to be about five or six days old: they, I find, like puppies, are born blind, and could not see when they came to my hands. No doubt their spines are soft and flexible at the time of their birth, or else the poor dam would have but a bad time of it in the critical moment of parturition: but it is plain that they soon harden; for these little pigs had such stiff prickles on their backs and sides as would easily have fetched blood, had they not been handled with caution. Their spines are quite white at this age; and they have little hanging ears, which I do not remember to be discernible in the old ones. They can, in part, at this age draw their skin down over their faces; but are not able to contract themselves into a ball, as they do, for the sake of defence, when full grown. The reason, I suppose, is, because the curious muscle that enables the creature to roll itself up in a ball was not then arrived at its

full tone and firmness. Hedge-hogs make a deep and warm *hybernaculum* with leaves and moss, in which they conceal themselves for the Winter: but I never could find that they stored in any Winter provision, as some quadrupeds certainly do.

I have discovered an anecdote with respect to the fieldfare *(turdus pilaris)*, which I think is particular enough: this bird, though it sits on trees in the day-time, and procures the greatest part of its food from white-thorn hedges; yea, moreover, builds on very high trees; as may be seen by the *fauna suecica;* yet always appears with us to roost on the ground. They are seen to come in flocks just before it is dark, and to settle and nestle among the heath on our forest. And besides, the larkers, in dragging their nets by night, frequently catch them in the wheat-stubbles; while the bat-fowlers, who take many red-wings in the hedges, never entangle any of this species. Why these birds, in the matter of roosting, should differ from all their congeners, and from themselves also with respect to their

proceedings by day, is a fact for which I am by no means able to account.

I have somewhat to inform you of concerning the *moose-deer;* but in general foreign animals fall seldom in my way; my little intelligence is confined to the narrow sphere of my own observations at home.

LETTER XXVIII.

TO THE SAME.

DEAR SIR; SELBORNE, March 1770.

ON *Michaelmas-day* 1768 I managed to get a sight of the female moose belonging to the duke of *Richmond,* at *Goodwood;* but was greatly disappointed, when I arrived at the spot, to find that it died, after having appeared in a languishing way for some time, on the morning before. However, understanding that it was not stripped, I proceeded to examine this rare quadruped; I found it in an old greenhouse, slung under

the belly and chin by ropes, and in a standing posture; but, though it had been dead for so short a time, it was in so putrid a state that the stench was hardly supportable. The grand distinction between this deer, and any other species that I have ever met with, consisted in the strange length of its legs; on which it was tilted up much in the manner of the birds of the *grallæ* order. I measured it, as they do an horse, and found that, from the ground to the wither, it was just five feet four inches; which height answers exactly to sixteen hands, the growth that few horses arrive at: but then, with this length of legs, its neck was remarkably short, no more than twelve inches; so that, by straddling with one foot forward and the other backward, it grazed on the plain ground, with the greatest difficulty, between its legs: the ears were vast and lopping, and as long as the neck; the head was about twenty inches long, and ass-like; and had such a redundancy of upper lip as I never saw before, with huge nostrils. This lip,

travellers say, is esteemed a dainty dish in *North America.* It is very reasonable to suppose that this creature supports itself chiefly by browsing of trees, and by wading after water plants; towards which way of livelihood the length of legs and great lip must contribute much. I have read somewhere that it delights in eating the *nymphæa,* or water-lily. From the fore-feet to the belly behind the shoulder it measured three feet and eight inches; the length of the legs before and behind consisted a great deal in the *tibia,* which was strangely long; but, in my haste to get out of the stench, I forgot to measure that joint exactly. Its scut seemed to be about an inch long; the colour was a grizzly black; the mane about four inches long; the fore-hoofs were upright and shapely, the hind flat and splayed. The Spring before it was only two years old, so that most probably it was not then come to its growth. What a vast tall beast must a full grown stag be! I have been told some arrive at ten feet and a half! This poor creature had at first a female companion of

the same species, which died the Spring before. In the same garden was a young stag, or red deer, between whom and this moose it was hoped that there might have been a breed; but their inequality of height must have always been a bar to any commerce of the amorous kind. I should have been glad to have examined the teeth, tongue, lips, hoofs, &c. minutely; but the putrefaction precluded all farther curiosity. This animal, the keeper told me, seemed to enjoy itself best in the extreme frost of the former Winter. In the house they showed me the horn of a male moose, which had no front-antlers, but only a broad palm with some snags on the edge. The noble owner of the dead moose proposed to make a skeleton of her bones.

Please to let me hear if my female moose corresponds with that you saw; and whether you think still that the *American* moose and *European* elk are the same creature.

I am,

With the greatest esteem, &c.

LETTER XXIX.

TO THE SAME.

DEAR SIR; SELBORNE, May 12, 1770.

LAST month we had such a series of cold turbulent weather, such a constant succession of frost, and snow, and hail, and tempest, that the regular migration or appearance of the Summer birds was much interrupted. Some did not show themselves (at least were not heard) till weeks after their usual time; as the *black-cap* and *white-throat;* and some have not been heard yet, as the *grasshopper-lark* and largest *willow-wren.* As to the *fly-catcher,* I have not seen it; it is indeed one of the latest, but should appear about this time: and yet, amidst all this meteorous strife and war of the elements, two swallows discovered themselves as long ago as the eleventh of *April,* in frost and snow; but they withdrew quickly, and were not visible again for many days.

House-martins, which are always more backward than Swallows, were not observed till *May* came in.

Among the *monogamous* birds several are to be found, after pairing-time, single, and of each sex: but whether this state of celibacy is matter of choice or necessity, is not so easily discoverable. When the house-sparrows deprive my martins of their nests, as soon as I cause one to be shot, the other, be it cock or hen, presently procures a mate, and so for several times following.

I have known a dove-house infested by a pair of white owls, which made great havock among the young pigeons: one of the owls was shot as soon as possible; but the survivor readily found a mate, and the mischief went on. After some time the new pair were both destroyed, and the annoyance ceased.

Another instance I remember of a sportsman, whose zeal for the increase of his game being greater than his humanity, after pairing-time he always shot the cock bird of every couple of partridges upon

his grounds; supposing that the rivalry of many males interrupted the breed: he used to say, that, though he had widowed the same hen several times, yet he found she was still provided with a fresh paramour, that did not take her away from her usual haunt.

Again; I knew a lover of setting, an old sportsman, who has often told me that soon after harvest he has frequently taken small coveys of partridges, consisting of cock-birds alone; these he pleasantly used to call old bachelors.

There is a propensity belonging to common house-cats that is very remarkable; I mean their violent fondness for fish, which appears to be their most favourite food; and yet nature in this instance seems to have planted in them an appetite that, unassisted, they know not how to gratify: for of all quadrupeds cats are the least disposed towards water; and will not, when they can avoid it, deign to wet a foot, much less to plunge into that element.

Quadrupeds that prey on fish are amphi-

bious: such is the otter, which by nature is so well formed for diving, that it makes great havock among the inhabitants of the waters. Not supposing that we had any of those beasts in our shallow brooks, I was much pleased to see a male otter brought to me, weighing twenty-one pounds, that had been shot on the bank of our stream below the *Priory*, where the rivulet divides the parish of *Selborne* from *Harteley-wood*.

LETTER XXX.

TO THE SAME.

DEAR SIR; SELBORNE, Aug. 1, 1770.

THE *French*, I think, in general are strangely prolix in their natural history. What *Linnæus* says with respect to insects, holds good in every other branch: "*Ver-*" *bositas præsentis sæculi, calamitas artis.*"

Pray how do you approve of *Scopoli*'s new work? as I admire his *Entomologia*, I long to see it.

I forgot to mention in my last letter (and had not room to insert in the former) that the male moose, in rutting time, swims from island to island, in the lakes and rivers of *North America*, in pursuit of the females. My friend, the chaplain, saw one killed in the water as it was on that errand in the river of St. *Lawrence*: it was a monstrous beast, he told me; but he did not take the dimensions.

When I was last in town our friend Mr. *Barrington* most obligingly carried me to see many curious sights. As you were then writing to him about horns, he carried me to see many strange and wonderful specimens. There is, I remember, at Lord *Pembroke*'s, at *Wilton*, an horn-room furnished with more than thirty different pairs: but I have not seen that house lately.

Mr. *Barrington* showed me many astonishing collections of stuffed and living birds from all quarters of the world. After I had studied over the latter for a time, I remarked that every species almost that came from distant regions, such as *South America*, the coast of *Guinea*, &c. were thick-billed birds of the *loxia* and *fringilla* genera; and no *motacillæ* or *muscicapæ*, were to be met with. When I came to consider, the reason was obvious enough; for the hard-billed birds subsist on seeds which are easily carried on board, while the soft-billed birds, which are supported by worms and insects, or, what is a *succedaneum* for them, fresh raw meat, can meet with neither

in long and tedious voyages. It is from this defect of food that our collections (curious as they are) are defective, and we are deprived of some of the most delicate and lively genera.

I am, &c.

LETTER XXXI.

TO THE SAME.

DEAR SIR; SELBORNE, Sept. 14, 1770.

You saw, I find, the ring-ousels again among their native crags; and are farther assured that they continue resident in those cold regions the whole year. From whence then do our ring-ousels migrate so regularly every *September*, and make their appearance again, as if in their return, every *April?* They are more early this year than common, for some were seen at the usual hill on the fourth of this month.

An observing *Devonshire* gentleman tells me that they frequent some parts of *Dartmoor*, and breed there; but leave those haunts about the end of *September* or beginning of *October*, and return again about the end of *March*.

Another intelligent person assures me that they breed in great abundance all over the *Peak* of *Derby*, and are called there *Tor-ousels*; withdraw in *October* and *November*, and return in Spring. This information seems to throw some light on my new migration.

Scopoli's* new work (which I have just procured) has its merits in ascertaining many of the birds of the *Tirol* and *Carniola*. Monographers, come from whence they may, have, I think, fair pretence to challenge some regard and approbation from the lovers of natural history; for, as no man can alone investigate all the works of nature, these partial writers may, each in their department, be more accurate in their discoveries, and freer from errors, than

* *Annus Primus Historico-Naturalis.*

more general writers; and so by degrees may pave the way to an universal correct natural history. Not that *Scopoli* is so circumstantial and attentive to the life and conversation of his birds as I could wish: he advances some false facts; as when he says of the *hirundo urbica* that "*pullos extra* "*nidum non nutrit.*" This assertion I know to be wrong from repeated observation this Summer; for house-martins do feed their young flying, though it must be acknowledged not so commonly as the house swallow; and the feat is done in so quick a manner as not to be perceptible to indifferent observers. He also advances some (I was going to say) improbable facts; as when he says of the woodcock that "*pullos rostro* "*portat fugiens ab hoste.*" But candour forbids me to say absolutely that any fact is false, because I have never been witness to such a fact. I have only to remark that the long unwieldy bill of the woodcock is perhaps the worst adapted of any among the winged creation for such a feat of natural affection. I am, &c.

LETTER XXXII.

TO THE SAME.

DEAR SIR; SELBORNE, Oct. 29, 1770.

AFTER an ineffectual search in *Linnæus, Brisson,* &c. I begin to suspect that I discern my brother's *hirundo hyberna* in *Scopoli*'s new-discovered *hirundo rupestris,* p. 167. His description of "*Supra murina, subtus "albida; rectrices maculâ ovali albâ in latere "interno; pedes nudi, nigri; rostrum nigrum, "remiges obscuriores quam plumæ dorsales; "rectrices remigibus concolores; caudâ "emarginatâ nec forcipatâ;* agrees very well with the bird in question; but when he comes to advance that it is "*statura "hirundinis urbicæ*" and that "" *definitio "hirundinis ripariæ Linnæi huic quoque con-"venit,*" he in some measure invalidates all he has said; at least he shows at once that he compares them to these species merely from memory: for I have compared the

birds themselves, and find they differ widely in every circumstance of shape, size, and colour. However, as you will have a specimen, I shall be glad to hear what your judgment is in the matter.

Whether my brother is forestalled in his non-descript or not, he will have the credit of first discovering that they spend their winters under the warm and sheltry shores of *Gibraltar* and *Barbary*.

Scopoli's characters of his ordines and genera are clear, just, and expressive, and much in the spirit of *Linnæus*. These few remarks are the result of my first perusal of *Scopoli*'s *Annus Primus*.

The bane of our science is the comparing one animal to the other by memory: for want of caution in this particular *Scopoli* falls into errors: he is not so full with regard to the manners of his indigenous birds as might be wished, as you justly observe: his Latin is easy, elegant, and expressive, and very superior to *Kramer*'s.*

* See his *Elenchus vegetabilium et animalium per Austriam inferiorem, &c.*

I am pleased to see that my description of the *moose* corresponds so well with yours. I am, &c.

LETTER XXXIII.

TO THE SAME.

DEAR SIR; SELBORNE, Nov. 26, 1770.

I WAS much pleased to see, among the collection of birds from *Gibraltar*, some of those short-winged *English* summer-birds of passage, concerning whose departure we have made so much inquiry. Now if these birds are found in *Andalusia* to migrate to and from *Barbary*, it may easily be supposed that those that come to us may migrate back to the continent, and spend their Winters in some of the warmer parts of *Europe*. This is certain, that many soft-billed birds that come to *Gibraltar* appear there only in Spring and Autumn, seeming to advance in pairs towards the northward.

for the sake of breeding during the Summer-months; and retiring in parties and broods towards the South at the decline of the year: so that the rock of *Gibraltar* is the great rendezvous, and place of observation, from whence they take their departure each way towards *Europe* or *Africa*. It is therefore no mean discovery, I think, to find that our small short-winged summer-birds of passage are to be seen Spring and Autumn on the very skirts of *Europe*; it is a presumptive proof of their emigrations.

Scopoli seems to me to have found the *hirundo melba*, the great *Gibraltar* swift, in *Tirol*, without knowing it. For what is his *hirundo alpina* but the afore-mentioned bird in other words? Says he *Omnia pri-* "*oris*" (meaning the swift); "*sed pectus al-* "*bum; paulo major priore.*" I do not suppose this to be a new species. It is true also of the *melba*, that "*nidificat in excelsis* "*Alpium rupibus.*" *Vid. Annum Primum.*

My *Sussex* friend, a man of observation and good sense, but no naturalist, to whom

I applied on account of the *stone-curlew, oedicnemus,* sends me the following account: "In looking over my Naturalist's Journal "for the month of *April,* I find the *stone-* "*curlews* are first mentioned on the seven- "teenth and eighteenth, which date seems "to me rather late. They live with us all "the Spring and Summer, and at the begin- "ning of Autumn prepare to take leave by "getting together in flocks. They seem to "me a bird of passage that may travel into "some dry hilly country South of us, pro- "bably Spain, because of the abundance "of sheep-walks in that country; for they "spend their Summers with us in such "districts. This conjecture I hazard, as "I have never met with any one that has "seen them in *England* in the Winter. I "believe they are not fond of going near "the water, but feed on earth-worms, that "are common on sheep-walks and downs. "They breed on fallows and lay-fields "abounding with grey mossy flints, which "much resemble their young in colour; "among which they skulk and conceal

" themselves. They make no nest, but " lay their eggs on the bare ground, pro- " ducing in common but two at a time. " There is reason to think their young run " soon after they are hatched; and that " the old ones do not feed them, but only " lead them about at the time of feeding, " which, for the most part, is in the night." Thus far my friend.

In the manners of this bird you see there is something very analogous to the bustard, whom it also somewhat resembles in aspect and make, and in the structure of its feet.

For a long time I have desired my relation to look out for these birds in *Andalusia*; and now he writes me word that, for the first time, he saw one dead in the market on the third of *September*.

When the *oedicnemus* flies it stretches out its legs straight behind, like an heron.

I am, &c.

LETTER XXXIV.

TO THE SAME.

DEAR SIR; SELBORNE, March 30, 1771.

THERE is an insect with us, especially on chalky districts, which is very troublesome and teasing all the latter end of the Summer, getting into people's skins, especially those of women and children, and raising tumours which itch intolerably. This animal (which we call an harvest bug) is very minute, scarce discernible to the naked eye, of a bright scarlet colour, and of the genus of *Acarus*. They are to be met with in gardens on kidney beans, or any legumens; but prevail only in the hot months of Summer. Warreners, as some have assured me, are much infested by them on chalky downs; where these insects swarm sometimes to so infinite a degree as to discolour their nets, and to give them a reddish cast,

while the men are so bitten as to be thrown into fevers.

There is a small long shining fly in these parts very troublesome to the housewife, by getting into the chimnies, and laying its eggs in the bacon while it is drying: these eggs produce maggots called *jumpers*, which, harbouring in the gammons and best parts of the hogs, eat down to the bone, and make great waste. This fly I suspect to be a variety of the *musca putris* of *Linnæus:* it is to be seen in the Summer in farm-kitchens on the bacon racks and about the mantel-pieces, and on the ceilings.

The insect that infests turnips and many crops in the garden (destroying often whole fields while in their seedling leaves) is an animal that wants to be better known. The country people here call it the *turnip-fly* and *black dolphin;* but I know it to be one of the *coleoptera;* the "*chrysomela oleracea, saltatoria, femoribus posticis crassissimis.*" In very hot Summers they abound to an amazing degree, and as you walk in a field or in a garden, make a pattering like rain, by

jumping on the leaves of the turnips or cabbages.

There is an *Oestrus,* known in these parts to every ploughboy; which, because it is omitted by *Linnæus,* is also passed over by late writers; and that is the *curvicauda* of old *Moufet,* mentioned by *Derham* in his Physico-theology, p. 250: an insect worthy of remark for depositing its eggs as it flies in so dexterous a manner on the single hairs of the legs and flanks of grass-horses. But then *Derham* is mistaken when he advances that this *Oestrus* is the parent of that wonderful star-tailed maggot which he mentions afterwards; for more modern entomologists have discovered that singular production to be derived from the egg of the *musca chamæleon:* see *Geoffroy,* t. 17, f. 4.

A full history of noxious insects hurtful in the field, garden, and house, suggesting all the known and likely means of destroying them, would be allowed by the public to be a most useful and important work. What knowledge there is of this sort lies scattered, and wants to be collected; great

improvements would soon follow of course. A knowledge of the properties, economy, propagation, and, in short, of the life and conversation of these animals, is a necessary step to lead us to some method of preventing their depredations.

As far as I am a judge, nothing would recommend entomology more than some neat plates that should well express the *generic distinctions* of insects according to *Linnæus*; for I am well assured that many people would study insects, could they set out with a more adequate notion of those distinctions than can be conveyed at first by words alone.

LETTER XXXV.

TO THE SAME.

DEAR SIR; SELBORNE, 1771.

HAPPENING to make a visit to my neighbour's peacocks, I could not help observing that the trains of those magnificent birds

appear by no means to be their tails; those long feathers growing not from their *uropygium*, but all up their backs. A range of short brown stiff feathers, about six inches long, fixed in the *uropygium*, is the real tail, and serves as the *fulcrum* to prop the train, which is long and top-heavy, when set an end. When the train is up, nothing appears of the bird before but it's head and neck; but this would not be the case were those long feathers fixed only in the rump, as may be seen by the turkey-cock when in a strutting attitude. By a strong muscular vibration these birds can make the shafts of their long feathers clatter like the swords of a sword dancer; they then trample very quick with their feet, and run backwards towards the females.

I should tell you that I have got an uncommon *calculus ægogropila*, taken out of the stomach of a fat ox; it is perfectly round, and about the size of a large *Seville* orange; such are, I think, usually flat.

LETTER XXXVI.

TO THE SAME.

DEAR SIR; Sept. 1771.

THE Summer through I have seen but two of that large species of bat which I call *vespertilio altivolans*, from its manner of feeding high in the air: I procured one of them, and found it to be a male: and made no doubt, as they accompanied together, that the other was a female: but, happening in an evening or two to procure the other likewise, I was somewhat disappointed, when it appeared to be also of the same sex. This circumstance, and the great scarcity of this sort, at least in these parts, occasions some suspicions in my mind whether it is really a species, or whether it may not be the male part of the more known species, one of which may supply many females; as is known to be the case in sheep, and some other quadrupeds. But this doubt can only be cleared by a farther

examination, and some attention to the sex, of more specimens: all that I know at present is, that my two were amply furnished with the parts of generation, much resembling those of a boar.

In the extent of their wings they measured fourteen inches and an half: and four inches and an half from the nose to the tip of the tail: their heads were large, their nostrils bilobated, their shoulders broad and muscular; and their whole bodies fleshy and plump. Nothing could be more sleek and soft than their fur, which was of a bright chesnut colour; their maws were full of food, but so macerated that the quality could not be distinguished; their livers, kidnies, and hearts, were large, and their bowels covered with fat. They weighed each, when entire, full one ounce and one drachm. Within the ear there was somewhat of a peculiar structure that I did not understand perfectly: but refer it to the observation of the curious anatomist. These creatures sent forth a very rancid and offensive smell.

LETTER XXXVII.

TO THE SAME.

DEAR SIR ; SELBORNE, 1771.

ON the twelfth of *July* I had a fair opportunity of contemplating the motions of the *caprimulgus*, or fern-owl, as it was playing round a large oak that swarmed with *scarabæi solstitiales*, or fern-chafers. The powers of its wing were wonderful, exceeding, if possible, the various evolutions and quick turns of the swallow genus. But the circumstance that pleased me most was, that I saw it distinctly more than once, put out its short leg while on the wing, and, by a bend of the head, deliver somewhat into its mouth. If it takes any part of its prey with its foot, as I have now the greatest reason to suppose it does these chafers, I no longer wonder at the use of its middle toe, which is curiously furnished with a serrated claw.

Swallows and martins, the bulk of them I mean, have forsaken us sooner this year than usual; for, on *September* the twenty-second, they rendezvoused in a neighbour's walnut-tree, where it seemed probable they had taken up their lodging for the night. At the dawn of the day, which was foggy, they rose all together in infinite numbers, occasioning such a rushing from the strokes of their wings against the hazy air, as might be heard to a considerable distance; since that no flock has appeared, only a few stragglers.

Some swifts staid late, till the twenty-second of *August*—a rare instance! for they usually withdraw within the first week.*

On *September* the twenty-fourth three or four ring-ousels appeared in my fields for the first time this season: how punctual are these visitors in their Autumnal and Spring migrations!

* See Letter liii. to Mr. *Barrington*.

LETTER XXXVIII.

TO THE SAME.

DEAR SIR; SELBORNE, March 15, 1773.

By my journal for last Autumn it appears that the house-martins bred very late, and staid very late in these parts; for, on the first of *October*, I saw young martins in their nest nearly fledged; and again, on the twenty-first of *October*, we had at the next house a nest full of young martins just ready to fly; and the old ones were hawking for insects with great alertness. The next morning the brood forsook their nest, and were flying round the village. From this day I never saw one of the swallow kind till *November* the third; when twenty, or perhaps thirty, house-martins were playing all day long by the side of the hanging wood, and over my fields. Did these small weak birds, some of which were nestlings

twelve days ago, shift their quarters at this late season of the year to the other side of the northern tropic? Or rather, is it not more probable that the next church, ruin, chalk-cliff, steep covert, or perhaps sand-bank, lake or pool (as a more northern naturalist would say), may become their *hybernaculum*, and afford them a ready and obvious retreat?

We now begin to expect our vernal migration of ring-ousels every week. Persons worthy of credit assure me that ring-ousels were seen at *Christmas* 1770 in the forest of *Bere*, on the southern verge of this county. Hence we may conclude that their migrations are only internal, and not extended to the continent southward, if they do at first come at all from the northern parts of this island only, and not from the north of *Europe*. Come from whence they will, it is plain, from the fearless disregard that they show for men or guns, that they have been little accustomed to places of much resort. Navigators mention that, in the *Isle of Ascension*, and other

such desolate districts, birds are so little acquainted with the human form that they settle on men's shoulders; and have no more dread of a sailor than they would have of a goat that was grazing. A young man at *Lewes*, in *Sussex*, assured me that about seven years ago ring-ousels abounded so about that town in the Autumn, that he killed sixteen himself in one afternoon: he added further, that some had appeared since in every Autumn; but he could not find that any had been observed before the season in which he shot so many. I myself have found these birds in little parties in the Autumn cantoned all along the *Sussex* downs, wherever there were shrubs and bushes, from *Chichester* to *Lewes*; particularly in the Autumn of 1770.

I am, &c.

LETTER XXXIX.

TO THE SAME.

DEAR SIR; SELBORNE, Nov. 9, 1773.

As you desire me to send you such observations as may occur, I take the liberty of making the following remarks, that you may, according as you think me right or wrong, admit or reject what I here advance, in your intended new edition of the *British Zoology*.

The osprey* was shot about a year ago at *Frinsham-pond*, a great lake, at about six miles from hence, while it was sitting on the handle of a plough and devouring a fish: it used to precipitate itself into the water, and so take its prey by surprise.

A great ash-couloured† butcher-bird was shot last winter in *Tisted-park*, and a red-

* British Zoology, vol. i. p. 128. † P. 161.

backed butcher-bird at *Selborne:* they are *raræ aves* in this country.

Crows * go in pairs the whole year round.

Cornish choughs† abound, and breed on *Beachy-Head* and on all the cliffs of the *Sussex* coast.

The common wild pigeon,‡ or stock dove, is a bird of passage in the south of England, seldom appearing till towards the end of *November:* is usually the latest winter-bird of passage. Before our beechen woods were so much destroyed, we had myriads of them, reaching in strings for a mile together as they went out in a morning to feed. They leave us early in Spring; where do they breed?

The people of *Hampshire* and *Sussex* call the missel-bird§ the storm-cock, because it sings early in the Spring in blowing showery weather; its song often commences with the year: with us it builds much in orchards.

* British Zoology, vol. i. p. 167. † P. 198.
‡ P. 216. § P. 224.

A gentleman assures me he has taken the nests of ring-ousels* on *Dartmoor:* they build in banks on the sides of streams.

Titlarks† not only sing sweetly as they sit on trees, but also as they play and toy about on the wing; and particularly while they are descending, and sometimes as they stand on the ground.

Adanson's‡ testimony seems to me to be a very poor evidence that *European* swallows migrate during our winter to *Senegal;* he does not talk at all like an ornithologist; and probably saw only the swallows of that country, which I know build within Governor *O' Hara*'s hall against the roof. Had he known *European* swallows, would he not have mentioned the species?

The *house-swallow* washes by dropping into the water as it flies: this species appears commonly about a week before the *house-martin,* and about ten or twelve days before the *swift.*

* British Zoology, vol. i. p. 229.

† Vol. ii. p. 237. ‡ P. 242,

In 1772 there were young house-martins* in their nest till *October* the twenty-third.

The *swift*† appears about *ten* or *twelve* days later than the *house-swallow: viz.* about the twenty-fourth or twenty-sixth of *April.*

Whin-chats and *stone-chatters*‡ stay with us the whole year.

Some wheat-ears§ continue with us the Winter through.

Wagtails, all sorts, remain with us all the Winter.

Bulfinches,‖ when fed on hempseed, often become wholly black.

We have vast flocks of *female* chaffinches¶ all the Winter, with hardly any males among them.

When you say that in breeding time the cock-snipes** make a bleating noise, and I a drumming (perhaps I should have ra-

* British Zoology, vol. ii. p. 244. † P. 245.
‡ P. 270, 271. § P. 269. ‖ P. 300.
¶ P. 306. ** P. 358.

ther said an humming), I suspect we mean the same thing. However, while they are playing about on the wing they certainly make a loud piping with their mouths: but whether that bleating or humming is ventriloquous, or proceeds from the motion of their wings, I cannot say; but this I know, that when this noise happens the bird is always descending, and his wings are violently agitated.

Soon after the lapwings* have done breeding, they congregate, and, leaving the moors and marshes, betake themselves to downs and sheep-walks.

Two years ago† last Spring the little auk was found alive and unhurt, but fluttering and unable to rise, in a lane a few miles from *Alresford*, where there is a great lake: it was kept awhile, but died.

I saw young teals‡ taken alive in the ponds of *Wolmer-forest* in the beginning of July last, along with flappers, or young wild-ducks.

* British Zoology, vol. ii. p. 360. † P. 409.
‡ P. 475.

Speaking of the *swift*,* that page says "*its drink the dew*;" whereas it should be "it drinks on the wing;" for all the swallow kind sip their water as they sweep over the face of pools or rivers: like *Virgil*'s bees, they drink flying; "*flumina summa libant.*" In this method of drinking perhaps this genus may be peculiar.

Of the sedge-bird† be pleased to say it sings most part of the night; its notes are hurrying, but not unpleasing, and imitative of several birds; as the sparrow, swallow, sky-lark. When it happens to be silent in the night, by throwing a stone or clod into the bushes where it sits, you immediately set it a singing; or, in other words, though it slumbers sometimes, yet as soon as it is awakened it reassumes its song.

* British Zoology, vol. ii. p. 15. † P. 16.

LETTER XL.

TO THE SAME.

DEAR SIR; SELBORNE, Sept. 2, 1774.

BEFORE your letter arrived, and of my own accord, I had been remarking and comparing the tails of the male and female swallow, and this ere any young broods appeared: so that there was no danger of confounding the dams with their *pulli:* and besides, as they were then always in pairs, and busied in the employ of nidification, there could be no room for mistaking the sexes, nor the individuals of different chimnies the one for the other. From all my observations, it constantly appeared that each sex has the long feathers in its tail that give it that forked shape; with this difference, that they are longer in the tail of the male than in that of the female.

Nightingales, when their young first come abroad, and are helpless, make a

plaintive and a jarring noise; and also a snapping or cracking, pursuing people along the hedges as they walk: these last sounds seem intended for menace and defiance.

The grasshopper-lark chirps all night in the height of Summer.

Swans turn white the second year, and breed the third.

Weasels prey on moles, as appears by their being sometimes caught in mole-traps.

Sparrow-hawks sometimes breed in old crows' nests, and the kestril in churches and ruins.

There are supposed to be two sorts of eels in the island of *Ely*. The threads sometimes discovered in eels are perhaps their young: the generation of eels is very dark and mysterious.

Hen-harriers breed on the ground, and seem never to settle on trees.

When redstarts shake their tails they move them horizontally, as dogs do when they fawn: the tail of the wagtail, when in

motion, bobs up and down like that of a jaded horse.

Hedge-sparrows have a remarkable flirt with their wings in breeding-time: as soon as frosty mornings come they make a very piping plaintive noise.

Many birds which become silent about *Midsummer* reassume their notes again in *September;* as the thrush, blackbird, wood-lark, willow-wren, &c.; hence *August* is by much the most mute month, the Spring, Summer, and Autumn through. Are birds induced to sing again because the temperament of Autumn resembles that of Spring?

Linnæus ranges plants geographically; palms inhabit the tropics, grasses the temperate zones, and mosses and lichens the polar circles; no doubt animals may be classed in the same manner with propriety.

House-sparrows build under eaves in the Spring; as the weather becomes hotter they get out for coolness, and nest in plum-trees and apple-trees. These birds have been known sometimes to build in rooks'

nests, and sometimes in the forks of boughs under rooks' nests.

As my neighbour was housing a rick he observed that his dogs devoured all the little red mice that they could catch, but rejected the common mice; and that his cats eat the common mice, refusing the red.

Red-breasts sing all through the Spring, Summer, and Autumn. The reason that they are called Autumn songsters is, because in the two first seasons their voices are drowned and lost in the general chorus; in the latter their song becomes distinguishable. Many songsters of the Autumn seem to be the young cock red-breast of that year: notwithstanding the prejudices in their favour, they do much mischief in gardens to the Summer-fruits*

The titmouse, which early in *February* begins to make two quaint notes, like the whetting of a saw, is the marsh titmouse, the great titmouse sings with three cheerful

* They eat also the berries of the ivy, the honeysuckle, and the *euonymus europæus,* or spindle-tree.

joyous notes, and begins about the same time.

Wrens sing all the Winter through, frost excepted.

House-martins came remarkably late this year both in *Hampshire* and *Devonshire:* is this circumstance for or against either hiding or migration?

Most birds drink sipping at intervals; but pigeons take a long continued draught, like quadrupeds.

Notwithstanding what I have said in a former letter, no grey crows were ever known to breed on *Dartmoor*; it was my mistake.

The appearance and flying of the *scarabæus solstitialis,* or fern-chafer, commence with the month of *July,* and cease about the end of it. These scarabs are the constant food of *caprimulgi,* or fern owls, through that period. They abound on the chalky downs and in some sandy districts, but not in the clays.

In the garden of the *Black-bear* inn in the town of *Reading* is a stream or canal

running under the stables and out into the fields on the other side of the road: in this water are many carps, which lie rolling about in sight, being fed by travellers, who amuse themselves by tossing them bread: but as soon as the weather grows at all severe these fishes are no longer seen, because they retire under the stables, where they remain till the return of Spring. Do they lie in a torpid state? if they do not, how are they supported?

The note of the white-throat, which is continually repeated, and often attended with odd gesticulations on the wing, is harsh and displeasing. These birds seem of a pugnacious disposition; for they sing with an erected crest and attitudes of rivalry and defiance; are shy and wild in breeding-time, avoiding neighbourhoods, and haunting lonely lanes and commons; nay, even the very tops of the *Sussex-downs*, where there are bushes and covert; but in *July* and *August* they bring their broods into gardens and orchards, and make great havock among the summer-fruits.

The black-cap has, in common, a full, sweet, deep, loud, and wild pipe; yet that strain is of short continuance, and his motions are desultory; but when that bird sits calmly and engages in song in earnest, he pours forth very sweet, but inward melody, and expresses great variety of soft and gentle modulations, superior perhaps to those of any of our warblers, the nightingale excepted.

Black-caps mostly haunt orchards and gardens; while they warble their throats are wonderfully distended.

The song of the red-start is superior, though somewhat like that of the white-throat: some birds have a few more notes than others. Sitting very placidly on the top of a tall tree in a village, the cock sings from morning to night: he affects neighbourhoods, and avoids solitude, and loves to build in orchards and about houses; with us he perches on the vane of a tall maypole.

The fly-catcher is of all our Summer birds

the most mute and the most familiar; it also appears the last of any. It builds in a vine, or a sweetbriar, against the wall of an house, or in the hole of a wall, or on the end of a beam or plate, and often close to the post of a door where people are going in and out all day long. This bird does not make the least pretension to song, but uses a little inward wailing note when it thinks its young in danger from cats or other annoyances: it breeds but once, and retires early.

Selborne parish alone can and has exhibited at times more than half the birds that are ever seen in all *Sweden*; the former has produced more than one hundred and twenty species, the latter only two hundred and twenty-one. Let me add also that it has shown near half the species that were ever known in *Great-Britain*.*

On a retrospect, I observe that my long letter carries with it a quaint and magisterial air, and is very sententious; but, when

* *Sweden* 221, *Great-Britain* 252 species.

I recollect that you requested stricture and anecdote, hope you will pardon the didactic manner for the sake of the information it may happen to contain.

LETTER XLI.

TO THE SAME.

It is matter of curious inquiry to trace out how those species of soft-billed birds, that continue with us the Winter through, subsist during the dead months. The imbecility of birds seems not to be the only reason why they shun the rigour of our Winters; for the robust *wry-neck* (so much resembling the hardy race of *wood-peckers*) migrates, while the feeble little *golden-crowned wren*, that shadow of a bird, braves our severest frosts without availing himself of houses or villages, to which most of our Winter-birds crowd in distressful seasons,

while this keeps aloof in fields and woods; but perhaps this may be the reason why they may often perish, and why they are almost as rare as any bird we know.

I have no reason to doubt but that the soft-billed birds, which Winter with us, subsist chiefly on insects in their *aurelia* state. All the species of *wagtails* in severe weather haunt shallow streams near their spring-heads, where they never freeze; and, by wading, pick out the aurelias of the genus of *Phryganeæ*,* &c.

Hedge-sparrows frequent sinks and gutters in hard weather, where they pick up crumbs and other sweepings: and in mild weather they procure worms, which are stirring every month in the year, as any one may see that will only be at the trouble of taking a candle to a grass-plot on any mild Winter's night. Red-breasts and wrens in the Winter haunt out-houses, stables, and barns, where they find spiders and flies that have laid themselves up during the

* See *Derham*'s Physico-theology, p. 235.

cold season. But the grand support of the soft-billed birds in Winter is that infinite profusion of *aureliæ* of the *lepidoptera ordo*, which is fastened to the twigs of trees and their trunks; to the pales and walls of gardens and buildings; and is found in every cranny and cleft of rock or rubbish, and even in the ground itself.

Every species of titmouse Winters with us; they have what I call a kind of intermediate bill between the hard and the soft, between the *Linnæan* genera of *fringilla* and *motacilla*. One species alone spends its whole time in the woods and fields, never retreating for succour in the severest seasons to houses and neighbourhoods; and that is the delicate long-tailed titmouse, which is almost as minute as the golden-crowned wren: but the blue titmouse, or nun *(parus cæruleus)*, the cole-mouse *(parus ater)*, the great black-headed titmouse *(fringillago)*, and the marsh titmouse *(parus palustris)*, all resort, at times, to buildings; and in hard weather particularly. The great titmouse, driven by stress of weather, much

frequents houses, and, in deep snows, I have seen this bird, while it hung with its back downwards (to my no small delight and admiration), draw straws lengthwise from out the eaves of thatched houses, in order to pull out the flies that were concealed between them, and that in such numbers that they quite defaced the thatch, and gave it a ragged appearance.

The blue *titmouse,* or *nun,* is a great frequenter of houses, and a general devourer. Besides insects, it is very fond of flesh; for it frequently picks bones on dunghills: it is a vast admirer of suet, and haunts butchers' shops. When a boy, I have known twenty in a morning caught with snap mouse-traps, baited with tallow or suet. It will also pick holes in apples left on the ground, and be well entertained with the seeds on the head of a sun-flower. The blue, marsh, and great titmice will, in very severe weather, carry away barley and oat straws from the sides of ricks.

How the *wheat-ear* and *whin-chat* support themselves in Winter cannot be so

easily ascertained, since they spend their time on wild heaths and warrens; the former especially, where there are stone quarries: most probably it is, that their maintenance arises from the *aureliæ* of the *lepidoptera ordo,* which furnish them with a plentiful table in the wilderness.

I am, &c.

LETTER XLII.

TO THE SAME.

DEAR SIR; SELBORNE, March 9, 1775.

SOME future *faunist,* a man of fortune, will, I hope, extend his visits to the kingdom of *Ireland;* a new field, and a country little known to the naturalist. He will not, it is to be wished, undertake that tour unaccompanied by a botanist, because the mountains have scarcely been sufficiently examined; and the southerly counties of so mild an island may possibly afford some

plants little to be expected within the *British* dominions. A person of a thinking turn of mind will draw many just remarks from the modern improvements of that country, both in arts and agriculture, where premiums obtained long before they were heard of with us. The manners of the wild natives, their superstitions, their prejudices, their sordid way of life, will extort from him many useful reflections. He should also take with him an able draughtsman; for he must by no means pass over the noble castles and seats, the extensive and picturesque lakes and waterfalls, and the lofty stupendous mountains, so little known, and so engaging to the imagination when described and exhibited in a lively manner: such a work would be well received.

As I have seen no modern map of *Scotland*, I cannot pretend to say how accurate or particular any such may be; but this I know, that the best old maps of that kingdom are very defective.

The great obvious defect that I have remarked in all maps of *Scotland* that have

fallen in my way is, a want of a *coloured line*, or *stroke*, that shall exactly define the just limits of that district called *The Highlands*. Moreover, all the great avenues to that mountainous and romantic country want to be well distinguished. The military roads formed by general *Wade* are so great and Roman-like an undertaking that they well merit attention. My old map, *Moll*'s Map, takes notice of *Fort William;* but could not mention the other forts that have been erected long since: therefore a good representation of the chain of forts should not be omitted.

The celebrated zigzag up the *Coryarich* must not be passed over, *Moll* takes notice of *Hamilton* and *Drumlanrig*, and such capital houses; but a new survey, no doubt, should represent every seat and castle remarkable for any great event, or celebrated for its paintings, &c. Lord *Breadalbane*'s seat and beautiful *policy* are too curious and extraordinary to be omitted.

The seat of the Earl of *Eglintoun*, near

Glasgow, is worthy of notice. The pine-plantations of that nobleman are very grand and extensive indeed.

I am, &c.

LETTER XLIII.

TO THE SAME.

A PAIR of *honey-buzzards*, *buteo apivorus, sive vespivorus Raii*, built them a large shallow nest, composed of twigs and lined with dead beechen leaves, upon a tall slender beech near the middle of *Selborne-hanger*, in the summer of 1780. In the middle of the month of *June* a bold boy climbed this tree, though standing on so steep and dizzy a situation, and brought down an egg, the only one in the nest, which had been sat on for some time, and contained the embrio of a young bird. The egg was smaller, and not so round as those of the common buzzard; was dotted at

each end with small red spots, and surrounded in the middle with a broad bloody zone.

The hen-bird was shot, and answered exactly to Mr. *Ray*'s description of that species: had a black *cere*, short thick legs. and a long tail. When on the wing this species may be easily distinguished from the *common buzzard* by its hawk-like appearance, small head, wings not so blunt, and longer tail. This specimen contained in its craw some limbs of frogs and many grey snails without shells. The *irides* of the eyes of this bird were of a beautiful bright yellow colour.

About the tenth of *July* in the same Summer a pair of *sparrow-hawks* bred in an old crow's nest on a low beech in the same hanger; and as their brood, which was numerous, began to grow up, became so daring and ravenous, that they were a terror to all the dames in the village that had chickens or ducklings under their care. A boy climbed the tree, and found the young so fledged that they all escaped from him;

but discovered that a good house had been kept: the larder was well stored with provisions; for he brought down a young blackbird, jay, and house-martin, all clean picked, and some half devoured. The old birds had been observed to make sad havock for some days among the new-flown swallows and martins, which, being but lately out of their nests, had not acquired those powers and command of wing that enable them, when more mature, to set such enemies at defiance.

LETTER XLIV.

TO THE SAME.

DEAR SIR; SELBORNE, Nov. 30, 1780.

EVERY incident that occasions a renewal of our correspondence will ever be pleasing and agreeable to me.

As to the wild *wood-pigeon*, the *oenas*, or *vinago*, of *Ray*, I am much of your mind;

and see no reason for making it the origin of the common *house-dove:* but suppose those that have advanced that opinion may have been misled by another appellation, often given to the *oenas,* which is that of *stock-dove.*

Unless the stock-dove in the Winter varies greatly in manners from itself in Summer, no species seems more unlikely to be domesticated, and to make an *house-dove.* We very rarely see the latter settle on trees at all, nor does it ever haunt the woods; but the former, as long as it stays with us, from *November* perhaps to *February,* lives the same wild life with the *ring-dove, palumbus torquatus;* frequents coppices and groves, supports itself chiefly by mast, and delights to roost in the tallest beeches. Could it be known in what manner stock-doves build, the doubt would be settled with me at once, provided they construct their nests on trees, like the *ring-dove,* as I much suspect they do.

You received, you say, last Spring a *stock-dove* from *Sussex;* and are informed

that they sometimes breed in that county. But why did not your correspondent determine the place of its nidification, whether on rocks, cliffs, or trees? If he was not an adroit ornithologist I should doubt the fact, because people with us perpetually confound the *stock-dove* with the *ring-dove.*

For my own part, I readily concur with you in supposing that house-doves are derived from the *small blue rock-pigeon,* for many reasons. In the first place the wild stock-dove is manifestly larger than the common house-dove, against the usual rule of domestication, which generally enlarges the breed. Again, those two remarkable *black spots* on the remiges of each wing of the stock-dove, which are so characteristic of the species, would not, one should think, be totally lost by its being reclaimed; but would often break out among its descendants. But what is worth an hundred arguments is, the instance you give in Sir *Roger Mostyn*'s house-doves in *Caernarvonshire;* which, though tempted by

plenty of food and gentle treatment, can never be prevailed on to inhabit their cote for any time; but, as soon as they begin to breed, betake themselves to the fastnesses of *Ormshead*, and deposit their young in safety amidst the inaccessible caverns and precipices of that stupendous promontory.

"Naturam expellas furcâ . . . tamen usque recurret."

I have consulted a sportsman, now in his seventy-eighth year, who tells me that fifty or sixty years back, when the beechen woods were much more extensive than at present, the number of wood-pigeons was astonishing; that he has often killed near twenty in a day; and that with a long wild-fowl piece he has shot seven or eight at a time on the wing as they came wheeling over his head: he moreover adds, which I was not aware of, that often there were among them little parties of small *blue doves*, which he calls *rockiers*. The food of these numberless emigrants was beech-mast and some acorns; and particularly

barley, which they collected in the stubbles. But, of late years, since the vast increase of turnips, that vegetable has furnished a great part of their support in hard weather: and the holes they pick in these roots greatly damage the crop. From this food their flesh has contracted a rancidness which occasions them to be rejected by nicer judges of eating, who thought them before a delicate dish. They were shot not only as they were feeding in the fields, and especially in snowy weather, but also at the close of the evening, by men who lay in ambush among the woods and groves to kill them as they came in to roost.* These are the principal circumstances relating to this wonderful *internal* migration, which with us takes place towards the end of *November*, and ceases early in the Spring. Last Winter we had in *Selborne* high wood about an hundred of these

* Some old sportsmen say that the main part of these flocks used to withdraw as soon as the heavy *Christmas* frosts were over.

doves; but in former times the flocks were so vast not only with us but all the district round, that on mornings and evenings they traversed the air, like rooks, in strings, reaching for a mile together. When they thus rendezvoused here by thousands, if they happened to be suddenly roused from their roost-trees on an evening,

> "Their rising all at once was like the sound
> "Of thunder heard remote."———

It will by no means be foreign to the present purpose to add, that I had a relation in this neighbourhood who made it a practice, for a time, whenever he could procure the eggs of a *ring-dove*, to place them under a pair of doves that were sitting in his own pigeon-house; hoping thereby, if he could bring about a coalition, to enlarge his breed, and teach his own doves to beat out into the woods and to support themselves by mast: the plan was plausible, but something always interrupted the success; for though the birds

were usually hatched, and sometimes grew to half their size, yet none ever arrived at maturity. I myself have seen these foundlings in their nest displaying a strange ferocity of nature, so as scarcely to bear to be looked at, and snapping with their bills by way of menace. In short, they always died, perhaps for want of proper sustenance: but the owner thought that by their fierce and wild demeanor they frighted their foster-mothers, and so were starved.

Virgil, as a familiar occurrence, by way of simile, describes a dove haunting the cavern of a rock, in such engaging numbers, that I cannot refrain from quoting the passage: and *John Dryden* has rendered it so happily in our language, that without further excuse I shall add his translation also.

" Qualis speluncâ subitò commota Columba,
" Cui domus, et dulces latebroso in pumice nidi,
" Fertur in arva volans, plausumque exterrita pennis
" Dat tecto ingentem—mox aere lapsa quieto,
" Radit iter liquìdum, celeris neque commovet alas."

" As when a dove her rocky hold forsakes,
" Rous'd, in a fright her sounding wings she shakes;
" The cavern rings with clattering:—out she flies,
" And leaves her callow care, and cleaves the skies;
" At first she flutters:—but at length she springs
" To smoother flight, and shoots upon her wings."

I am, &c.

LETTER I.

TO THE

HONOURABLE DAINES BARRINGTON.

DEAR SIR; SELBORNE, June 30, 1769.

WHEN I was in town last month I partly engaged that I would some time do myself the honour to write to you on the subject of natural history: and I am the more ready to fulfil my promise, because I see you are a gentleman of great candour, and one that will make allowances; especially where the writer professes to be an *out-door naturalist,* one that takes his observations from the subject itself, and not from the writings of others.

The following is a List of the Summer Birds of Passage which I have discovered in this neighbourhood, ranged somewhat in the order in which they appear:

	RAII NOMINA.	USUALLY APPEARS ABOUT
1. Wryneck,	*Jynx, sive torquilla:*	The middle of *March:* harsh note.
2. Smallest willow-wren,	*Regulus non cristatus:*	*March* 23: chirps till *September.*
3. Swallow,	*Hirundo domestica:*	*April* 13.
4. Martin,	*Hirundo rustica:*	Ditto.
5 Sand-martin,	*Hirundo riparia:*	Ditto.
6. Black-cap,	*Atricapilla:*	Do. a sweet wild note.
7. Nightingale,	*Luscinia:*	Beginning of *April.*
8. Cuckoo,	*Cuculus:*	Middle of *April.*
9. Middle willow-wren,	*Regulus non cristatus:*	Ditto: a sweet plaintive note.
10. White-throat,	*Ficedulæ affinis:*	Do. mean note; sings on till *September.*
11. Red-start,	*Ruticilla:*	Ditto: more agreeable song.
12. Stone-Curlew,	*Oedicnemus:*	End of *March:* loud nocturnal whistle.
13. Turtle-dove,	*Turtur.*	
14. Grasshopper-lark,	*Alauda minima locustæ voce:*	Middle *April:* a small sibilous note, till the end of *July.*
15. Swift,	*Hirundo apus:*	About *April* 27.
16. Less reed-sparrow,	*Passer arundinaceus minor:*	A sweet polyglot, but hurrying: it has the notes of many birds.
17. Land-rail,	*Ortygometra:*	A loud harsh note, crex crex.
18. Largest willow-wren,	*Regulus non cristatus:*	*Cantat voce stridulâ locustæ;* end of *April,* on the tops of high beeches.

19. Goat-sucker, or fern-owl,	*Caprimulgus:*	Beginning of *May:* chatters by night with a singular noise.
20. Fly-catcher,	*Stoparola:*	*May* 12. A very mute bird: this is the latest Summer bird of passage.

This assemblage of curious and amusing birds belongs to ten several genera of the *Linnæan* system; and are all of the *ordo* of *passeres*, save the *jynx* and *cuculus*, which are *picæ*, and the *charadrius (oedicnemus)* and *rallus (ortygometra)*, which are *grallæ*.

These birds, as they stand numerically, belong to the following *Linnæan* genera:

	Jynx.	13. *Columba:*
2, 6, 7, 9, 10, 11, 16, 18.	*Motacilla:*	17. *Rallus:*
3, 4, 5, 15.	*Hirundo:*	19. *Caprimulgus.*
8.	*Cuculus:*	14. *Alauda:*
12.	*Charadrius.*	20. *Muscicapa.*

Most soft-billed birds live on insects, and not on grain and seeds; and therefore at the end of Summer they retire: but the following soft-billed birds, though insect-eaters, stay with us the year round:

RAII NOMINA.

Redbreast,	*Rubecula:*	These frequent houses; and haunt out-buildings in the Winter: eat spiders.
Wren,	*Passer troglodytes.*	

Hedge-sparrow,	*Curruca :*	Haunt sinks for crumbs and other sweepings.
White-wagtail.	*Motacilla alba :*	These frequent shallow rivulets near the Spring heads, where they never freeze: eat the aureliæ of Phryganea. The smallest birds that walk.
Yellow-wagtail,	*Motacilla flava :*	
Grey-wagtail,	*Motacilla cinerea :*	
Wheat-ear,	*Oenanthe.*	Some of these are to be seen with us the Winter through.
Whin-chat,	*Oenanthe secunda.*	
Stone-chatter,	*Oenanthe tertia.*	
Golden-crowned wren,	*Regulus cristatus.*	This is the smallest British bird: haunts the tops of tall trees; stays the Winter through.

A List of the Winter Birds of Passage round this neighbourhood, ranged somewhat in the order in which they appear :

RAII NOMINA

1. Ring-ousel,	*Merula torquata :*	This is a new migration, which I have lately discovered about *Michaelmas* week, and again about the fourteenth of *March.*
2. Redwing,	*Turdus iliacus :*	About old *Michaelmas.*
3. Fieldfare,	*Turdus pilaris :*	Though a percher by day, roosts on the ground.
4. Royston-crow,	*Cornix cinerea :*	Most frequent on downs.
5. Woodcock,	*Scolopax :*	Appears about old *Michaelmas.*
6. Snipe,	*Gallinago minor,*	Some snipes constantly breed with us.
7. Jack-snipe,	*Gallinago minima.*	
8. Wood-pigeon,	*Oenas :*	Seldom appears till late; not in such plenty as formerly.

9. Wild-swan,	*Cygnus ferus:*	On some large waters.
10. Wild-goose,	*Anser ferus.*	
11. Wild-duck,	*Anas torquata minor:*	On our lakes and streams.
12. Pochard,	*Anas fera fusca:*	
13. Wigeon,	*Penelope:*	
14. Teal, breeds with us in *Wolmer-forest.*	*Querquedula:*	
15. Cross-beak,	*Coccothraustes:*	These are only wanderers that appear occasionally, and are not observant of any regular migration.
16. Cross-bill,	*Lox:*	
17. Silk-tail,	*Garrulus bohemicus:*	

These birds, as they stand numerically, belong to the following *Linnæan* genera:

1, 2, 3,	*Turdus:*	9, 10, 11, 12, 13, 14,	*Anas:*
4	*Corvus:*	15, 16,	*Loxia:*
5, 6, 7,	*Scolopax:*	17,	*Ampelis.*
8,	*Columba:*		

Birds that sing in the night are but few.

Nightingale,	*Luscinia:*	"In shadiest covert hid." MILTON.
Woodlark,	*Alauda arborea:*	Suspended in mid air.
Less reed-sparrow.	*Passer arundinaceus minor:*	Among reeds and willows.

I shall now proceed to such birds as continue to sing after *Midsummer*, but as they are rather numerous, they would exceed the bounds of this paper: besides, as this is now the season for remarking on that subject, I am willing to repeat my

observations on some birds concerning the continuation of whose song I seem at present to have some doubt.

I am. &c.

LETTER II.

TO THE SAME.

DEAR SIR; SELBORNE, Nov. 2, 1769.

WHEN I did myself the honour to write to you about the end of last June on the subject of natural history, I sent you a list of the Summer-birds of passage which I have observed in this neighbourhood; and also a list of the Winter-birds of passage: I mentioned besides those soft-billed birds that stay with us the Winter through in the south of *England*, and those that are remarkable for singing in the night.

According to my proposal, I shall now proceed to such birds (singing birds strictly

so called) as continue in full song till after *Midsummer;* and shall range them somewhat in the order in which they first begin to open as the Spring advances.

RAII NOMINA.

1. Wood-lark,	*Alauda arborea :*	In *January*, and continues to sing through all the Summer and Autumn.
2. Song-thrush,	*Turdus simpliciter dictus :*	In *February* and on to *August*, reassume their song in *Autumn*.
3. Wren.	*Passer troglodytes :*	All the year, hard frost excepted.
4. Redbreast,	*Rubecula :*	Ditto.
5. Hedge-sparrow,	*Curruca :*	Early in *February*, to *July* the 10th.
6. Yellowhammer,	*Emberiza flava :*	Early in *February*, and on through *July* to *August* the 21st.
7. Skylark,	*Alauda vulgaris :*	In *February*, and on to *October*.
8. Swallow,	*Hirundo domestica :*	From *April* to *September*.
9. Black-cap,	*Atricapilla :*	Beginning of *April* to *July* 13th.
10. Titlark,	*Alauda pratorum :*	From middle of *April* to *July* the 16th.
11. Blackbird,	*Merula vulgaris :*	Sometimes in *February* and *March*, and so on to *July* the twenty-third; reassumes in Autumn.
12. White-throat,	*Ficedulæ affinis.*	In *April*, and on to *July* 23.
13. Goldfinch,	*Carduelis :*	*April*, and through to *September* 16.
14. Greenfinch,	*Chloris :*	On to *July* and *August* 2.

15. Less reed-sparrow,	*Passer arundinaceus minor:*	*May*, on to beginning of *July*.
16. Common linnet,	*Linaria vulgaris:*	Breeds and whistles on till *August;* reassumes its note when they begin to congregate in *October*, and again early before the flocks separate.

Birds that cease to be in full song, and are usually silent at or before *Midsummer* :

17. Middle willow-wren,	*Regulus non cristatus:*	Middle of *June:* begins in *April*.
18. Redstart,	*Ruticilla:*	Ditto: begins in *May*.
19. Chaffinch,	*Fringilla:*	Beginning of *June:* sings first in *February*.
20. Nightingale,	*Luscinia:*	Middle of *June:* sings first in *April*.

Birds that sing for a short time, and very early in the Spring:

21. Missel-bird,	*Turdus viscivorus:*	*January* the 2nd, 1770, in *February*. Is called in *Hampshire* and *Sussex* the storm-cock, because its song is supposed to forebode windy wet weather: is the largest singing bird we have.
22. Great titmouse, or ox-eye,	*Fringillago:*	In *February*, *March*, *April:* reassumes for a short time in *September*.

Birds that have somewhat of a note or song, and yet are hardly to be called singing birds:

	RAII NOMINA.	
23. Golden-crowned wren,	*Regulus cristatus:*	Its note as minute as its person; frequents the tops of high oaks and firs: the smallest *British* bird.
24. Marsh-titmouse,	*Parus palustris:*	Haunts great woods: two harsh sharp notes.
25. Small willow-wren.	*Regulus non cristatus:*	Sings in *March*, and on to *September*.
26. Largest ditto,	*Ditto:*	*Cantat voce striduld locustæ;* from end of *April* to *August*.
27. Grasshopper-lark,	*Alauda minima voce locustæ:*	Chirps all night, from the middle of *April* to the end of *July*.
28. Martin,	*Hirundo agrestis:*	All the breeding time; from *May* to *September*.
29. Bullfinch,	*Pyrrhula.*	
30. Bunting,	*Emberiza Alba:*	From the end of *January* to *July*.

All singing birds, and those that have any pretensions to song, not only in *Britain*, but perhaps the world through, come under the *Linnæan ordo* of *passeres*.

The above-mentioned birds, as they stand numerically, belong to the following *Linnæan* genera.

1, 7, 10, 27, 2, 11, 21, 3, 4, 5, 9, 12, 15, 17, 18. 20, 23, 25, 26, 6, 30.	*Alauda:*	8, 28,	*Hirundo:*
	Turdus:	13, 16, 19.	*Fringilla:*
	Motacilla:	22, 24,	*Parus:*
	Emberiza:	14, 29,	*Loxia:*

Birds that sing as they fly are but few:

	RAII NOMINA.	
Skylark,	*Alauda vulgaris* :	Rising, suspended, and falling.
Titlark,	*Alauda pratorum* :	In its descent; also sitting on trees, and walking on the ground.
Woodlark,	*Alauda arborea* :	Suspended; in hot Summer nights all night long.
Blackbird,	*Merula* :	Sometimes from bush to bush.
White-throat,	*Ficedulæ affinis* :	Uses when singing on the wing odd jerks and gesticulations.
Swallow,	*Hirundo domestica* :	In soft sunny weather.
Wren,	*Passer troglodytes* :	Sometimes from bush to bush.

Birds that breed most early in these parts:

Raven,	*Corvus* :	Hatches in *February* and *March*.
Song-thrush,	*Turdus* :	In *March*.
Blackbird,	*Merula* :	In *March*.
Rook,	*Cornix frugilega* :	Builds the beginning of *March*.
Woodlark,	*Alauda arborea* :	Hatches in *April*.
Ring-dove,	*Palumbus torquatus* :	Lays the beginning of *April*.

All birds that continue in full song till after *Midsummer* appear to me to breed more than once.

Most kinds of birds seem to me to be wild and shy somewhat in proportion to their bulk; I mean in this island, where

they are much pursued and annoyed: but in *Ascension Island*, and many other desolate places, mariners have found fowls so unacquainted with an human figure, that they would stand still to be taken; as is the case with boobies, &c. As an example of what is advanced, I remark that the *golden-crested wren* (the smallest *British* bird) will stand unconcerned till you come within three or four yards of it, while the *bustard (otis)*, the largest *British* land fowl, does not care to admit a person within so many furlongs. I am, &c.

LETTER III.

TO THE SAME.

DEAR SIR; SELBORNE, Jan. 15, 1770.

IT was no small matter of satisfaction to me to find that you were not displeased with my little *methodus* of birds. If there was any merit in the sketch, it must be

owing to its punctuality. For many months I carried a list in my pocket of the birds that were to be remarked, and, as I rode or walked about my business, I noted each day the continuance or omission of each bird's song; so that I am as sure of the certainty of my facts as a man can be of any transaction whatsoever.

I shall now proceed to answer the several queries which you put in your two obliging letters, in the best manner that I am able. Perhaps *Eastwick*, and its environs, where you heard so very few birds, is not a woodland country, and therefore not stocked with such songsters. If you will cast your eye on my last letter, you will find that many species continued to warble after the beginning of *July*.

The titlark and yellow hammer breed late, the latter very late; and therefore it is no wonder that they protract their song: for I lay it down as a maxim in ornithology, that as long as there is any incubation going on there is music. As to the redbreast and wren, it is well known to the most in-

curious observer that they whistle the year round, hard frost excepted; especially the latter.

It was not in my power to procure you a black-cap, or a less reed-sparrow, or sedge-bird, alive. As the first is undoubtedly, and the last, as far as I can yet see, a Summer bird of passage, they would require more nice and curious management in a cage than I should be able to give them: they are both distinguished songsters. The note of the former has such a wild sweetness that it always brings to my mind those lines in a song in "*As You Like It.*,"

> "And tune his merry note
> "Unto the *wild* bird's throat." SHAKESPEARE.

The latter has a surprising variety of notes resembling the song of several other birds; but then it has also an hurrying manner, not at all to its advantage: it is notwithstanding a delicate polyglot.

It is new to me that titlarks in cages sing in the night; perhaps only caged birds do so. I once knew a tame redbreast in a cage that always sang as long as candles

were in the room; but in their wild state no one supposes they sing in the night.

I should be almost ready to doubt the fact, that there are to be seen much fewer birds in *July* than in any former month, notwithstanding so many young are hatched daily. Sure I am, that it is far otherwise with respect to the *swallow tribe,* which increases prodigiously as the Summer advances: and I saw, at the time mentioned, many hundreds of young wagtails on the banks of the *Cherwell,* which almost covered the meadows. If the matter appears as you say in the other species, may it not be owing to the dams being engaged in incubation, while the young are concealed by the leaves?

Many times have I had the curiosity to open the stomach of *woodcocks* and *snipes;* but nothing ever occurred that helped to explain to me what their subsistence might be: all that I could ever find was a soft mucus, among which lay many pellucid small gravels. I am, &c.

LETTER IV.

TO THE SAME

DEAR SIR; SELBORNE, Feb. 19, 1770.

YOUR observation that "the *cuckoo* does "not deposit its egg indiscriminately in "the nest of the first bird that comes in its "way, but probably looks out a nurse in "some degree congenerous, with whom to "intrust its young," is perfectly new to me; and struck me so forcibly, that I naturally fell into a train of thought that led me to consider whether the fact was so, and what reason there was for it. When I came to recollect and inquire, I could not find that any cuckoo had ever been seen in these parts, except in the nest of the *wagtail*, the *hedge-sparrow*, the *titlark*, the *white-throat*, and the *red-breast*, all soft-billed insectivorous birds. The excellent Mr. *Willughby* mentions the nest of the *palumbus (ring-dove)*, and of the *fringilla (chaffinch)*, birds

that subsist on acorns and grains, and such hard food: but then he does not mention them as of his own knowledge; but says afterwards that he saw himself a *wagtail* feeding a cuckoo. It appears hardly possible that a soft-billed bird should subsist on the same food with the hard-billed: for the former have thin membranaceous stomachs suited to their soft food; while the latter, the granivorous tribe, have strong muscular gizzards, which, like mills, grind, by the help of small gravels and pebbles, what is swallowed. This proceeding of the cuckoo, of dropping its eggs as it were by chance, is such a monstrous outrage on maternal affection, one of the first great dictates of nature, and such a violence on instinct, that, had it only been related of a bird in the *Brazils*, or *Peru*, it would never have merited our belief. But yet, should it further appear that this simple bird, when divested of that natural στοργὴ that seems to raise the kind in general above themselves, and inspire them with extraordinary degrees of cunning and address, may be still

endued with a more enlarged faculty of discerning what species are suitable and congenerous nursing-mothers for its disregarded eggs and young, and may deposit them only under *their* care, this would be adding wonder to wonder, and instancing, in a fresh manner, that the methods of Providence are not subjected to any mode or rule, but astonish us in new lights, and in various and changeable appearances.

What was said by a very ancient and sublime writer concerning the defect of natural affection in the ostrich, may be well applied to the bird we are talking of:

"*She is hardened against her young ones,*
"*as though they were not her's:*
"*Because God hath deprived her of wis-*
"*dom, neither hath he imparted to her un-*
"*derstanding.*"*

Query. Does each female cuckoo lay but one egg in a season, or does she drop several in different nests according as opportunity offers? I am, &c.

* Job. xxxix. 16, 17.

LETTER V.

TO THE SAME.

DEAR SIR; SELBORNE, April 12, 1770.

I HEARD many birds of several species sing last year after *Midsummer;* enough to prove that the Summer solstice is not the period that puts a stop to the music of the woods. The yellow-hammer, no doubt, persists with more steadiness than any other; but the woodlark, the wren, the redbreast, the swallow, the white-throat, the goldfinch, the common linnet, are all undoubted instances of the truth of what I advanced.

If this severe season does not interrupt the regularity of the Summer migrations, the blackcap will be here in two or three days. I wish it was in my power to procure you one of those songsters; but I am no bird-catcher; and so little used to birds in a cage, that I fear if I had one it would soon die for want of skill in feeding.

Was your reed-sparrow, which you kept in a cage, the thick-billed reed-sparrow of the Zoology, p. 320; or was it the less reed-sparrow of *Ray*, the *sedge-bird* of Mr. *Pennant*'s last publication, p. 16?

As to the matter of long-billed birds growing fatter in moderate frosts, I have no doubt within myself what should be the reason. The thriving at those times appears to me to arise altogether from the gentle check which the cold throws upon insensible perspiration. The case is just the same with blackbirds, &c.; and farmers and warreners observe, the first, that their hogs fat more kindly at such times, and the latter that their rabbits are never in such good case as in a gentle frost. But when frosts are severe, and of long continuance, the case is soon altered; for then a want of food soon overbalances the repletion occasioned by a checked perspiration. I have observed, moreover, that some human constitutions are more inclined to plumpness in Winter than in Summer.

When birds come to suffer by severe frost, I find that the first that fail and die are the redwing-fieldfares, and then the song-thrushes.

You wonder, with good reason, that the hedge-sparrows, &c. can be induced at all to sit on the egg of the cuckoo without being scandalized at the vast disproportioned size of the supposititious egg: but the brute creation, I suppose, have very little idea of size, colour, or number. For the common hen, I know, when the fury of incubation is on her, will sit on a single shapeless stone instead of a nest full of eggs that have been withdrawn; and, moreover, a hen-turkey, in the same circumstances, would sit on in the empty nest till she perished with hunger.

I think the matter might easily be determined whether a cuckoo lays one or two eggs, or more, in a season, by opening a female during the laying-time. If more than one was come down out of the ovary, and advanced to a good size, doubtless

then she would that Spring lay more than one.

I will endeavour to get a hen, and to examine.

Your supposition that there may be some natural obstruction in singing birds while they are mute, and that when this is removed the song recommences, is new and bold; I wish you could discover some good grounds for this suspicion.

I was glad you were pleased with my specimen of the *caprimulgus*, or fern-owl; you were, I find, acquainted with the bird before.

When we meet, I shall be glad to have some conversation with you concerning the proposal you make of my drawing up an account of the animals in this neighbourhood. Your partiality towards my small abilities persuades you, I fear, that I am able to do more than is in my power: for it is no small undertaking for a man unsupported and alone to begin a natural history from his own autopsia! Though there is

endless room for observation in the field of nature, which is boundless, yet investigation (where a man endeavours to be sure of his facts) can make but slow progress; and all that one could collect in many years would go into a very narrow compass.

Some extracts from your ingenious "Investigations of the difference between the present temperature of the air in Italy," &c. have fallen in my way; and gave me great satisfaction; they have removed the objections that always arose in my mind whenever I came to the passages which you quote. Surely the judicious *Virgil*, when writing a didactic poem for the region of *Italy*, could never think of describing freezing rivers, unless such severity of weather pretty frequently occurred!

P. S. Swallows appear amidst snows and frost.

LETTER VI.

TO THE SAME.

DEAR SIR; SELBORNE, May 21, 1770.

THE severity and turbulence of last month so interrupted the regular process of Summer migration, that some of the birds do but just begin to show themselves, and others are apparently thinner than usual; as the white-throat, the black-cap, the red-start, the fly-catcher. I well remember that after the very severe Spring in the year 1739-40, Summer birds of passage were very scarce. They come probably hither with a south-east wind, or when it blows between those points; but in that unfavourable year the winds blowed the whole Spring and Summer through from the opposite quarters. And yet amidst all these disadvantages two swallows, as I mentioned in my last, appeared this year as early as the eleventh of *April* amidst

frost and snow; but they withdrew again for a time.

I am not pleased to find that some people seem so little satisfied with *Scopoli*'s new publication;* there is room to expect great things from the hands of that man, who is a good naturalist: and one would think that an history of the birds of so distant and southern a region as *Carniola* would be new and interesting. I could wish to see that work, and hope to get it sent down. Dr. *Scopoli* is physician to the wretches that work in the quicksilver mines of that district.

When you talked of keeping a reed-sparrow, and giving it seeds, I could not help wondering; because the reed-sparrow which I mentioned to you *(passer arundinaceus minor Raii)* is a soft-billed bird, and most probably migrates hence before Winter; whereas the bird you kept *(passer torquatus Raii)* abides all the year, and is a thick-billed bird. I question whether the

* This work he calls his *Annus Primus Historico Naturalis.*

latter be much of a songster; but in this matter I want to be better informed. The former has a variety of hurrying notes, and sings all night. Some part of the song of the former, I suspect is attributed to the latter. We have plenty of the soft-billed sort; which Mr. *Pennant* had entirely left out of his *British Zoology*, till I reminded him of his omission. See *British Zoology* last published, p. 16.*

I have somewhat to advance on the different manners in which different birds fly and walk; but as this is a subject that I have not enough considered, and is of such a nature as not to be contained in a small space, I shall say nothing further about it at present.†

No doubt the reason why the sex of birds in their first plumage is so difficult to be distinguished is, as you say, "because they "are not to pair and discharge their pa- "rental functions till the ensuing Spring." As colours seem to be the chief external

* See letter xxv. to Mr. *Pennant*.

† See letter xlii. to Mr. *Barrington*.

sexual distinction in many birds, these colours do not take place till sexual attachments begin to obtain. And the case is the same in quadrupeds; among whom, in their younger days, the sexes differ but little: but, as they advance to maturity, horns and shaggy manes, beards and brawny necks, &c. &c., strongly discriminate the male from the female. We may instance still further in our own species, where a beard and stronger features are usually characteristic of the male sex: but this sexual diversity does not take place in earlier life; for a beautiful youth shall be so like a beautiful girl that the difference shall not be discernible;

" Quem si puellarum insereres choro,
" Mirè sagaces falleret hospites
" Discrimen obscurum, solutis
" Crinibus, ambiguoque vultu." HOR.

LETTER VII.

TO THE SAME.

RINGMER, near LEWES,
Oct. 8, 1770.

DEAR SIR;

I AM glad to hear that *Kuckalm* is to furnish you with the birds of *Jamaica;* a sight of the *hirundines* of that hot and distant island would be a great entertainment to me.

The *Anni* of *Scopoli* are now in my possession; and I have read the *Annus Primus* with satisfaction: for though some parts of this work are exceptionable, and he may advance some mistaken observations; yet the ornithology of so distant a country as *Carniola* is very curious. Men that undertake only one district are much more likely to advance natural knowledge than those that grasp at more than they can possibly be acquainted with: every kingdom,

every province, should have its own *monographer.*

The reason, perhaps, why he mentions nothing of *Ray*'s Ornithology may be the extreme poverty and distance of his country, into which the works of our great naturalist may have never yet found their way. You have doubts, I know, whether this Ornithology is genuine, and really the work of *Scopoli:* as to myself, I think I discover strong tokens of authenticity; the style corresponds with that of his *Entomology;* and his characters of his Ordines and Genera are many of them new, expressive and masterly. He has ventured to alter some of the *Linnæan* genera with sufficient show of reason,

It might, perhaps, be mere accident that you saw so many swifts and no swallows at *Staines;* because, in my long observation of those birds, I never could discover the least degree of rivalry or hostility between the species.

Ray remarks that birds of the *gallinæ order,* as cocks and hens, partridges, and

pheasants, &c. are *pulveratrices,* such as dust themselves, using that method of cleansing their feathers, and ridding themselves of their vermin. As far as I can observe, many birds that dust themselves never wash: and I once thought that those birds that wash themselves would never dust; but here I find myself mistaken; for common house-sparrows are great *pulveratrices,* being frequently seen grovelling and wallowing in dusty roads; and yet they are great washers. Does not the skylark dust?

Query. Might not *Mahomet* and his followers take one method of purification from these *pulveratrices?* because I find from travellers of credit, that if a strict mussulman is journeying in a sandy desert where no water is to be found, at stated hours he strips off his clothes, and most scrupulously rubs his body over with sand or dust.

A countryman told me he had found a young *fern-owl* in the nest of a small bird on the ground; and that it was fed by the little bird. I went to see this extraordinary phenomenon, and found that it was a young

cuckoo hatched in the nest of a tit-lark: it was become vastly too big for its nest, appearing

> ——————— in tenui re
> Majores pennas nido extendisse——

and was very fierce and pugnacious, pursuing my finger, as I teased it, for many feet from the nest, and sparring and buffetting with its wings like a game-cock. The dupe of a dam appeared at a distance, hovering about with meat in its mouth, and expressing the greatest solicitude.

In *July* I saw several cuckoos skimming over a large pond; and found, after some observation, that they were feeding on the *libellulæ*, or *dragon-flies;* some of which they caught as they settled on the weeds, and some as they were on the wing. Notwithstanding what *Linnæus* says, I cannot be induced to believe that they are birds of prey.

This district affords some birds that are hardly ever heard of at *Selborne*. In the first place considerable flocks of *crossbeaks*

(loxia curvirostræ) have appeared this Summer in the pine-groves belonging to this house; the *water-ousel* is said to haunt the mouth of the *Lewes* river, near *Newhaven;* and the *Cornish chough* builds, I know, all along the chalky cliffs of the *Sussex* shore.

I was greatly pleased to see little parties of *ring-ousels* (my newly-discovered migraters) scattered, at intervals, all along the *Sussex* downs from *Chichester* to *Lewes.* Let them come from whence they will, it looks very suspicious that they are cantoned along the coast in order to pass the channel when severe weather advances. They visit us again in *April,* as it should seem, in their return; and are not to be found in the dead of Winter. It is remarkable that they are very tame, and seem to have no manner of apprehensions of danger from a person with a gun. There are bustards on the wide downs near *Brighthelmstone.* No doubt you are acquainted with the *Sussex* downs: the prospects and rides round *Lewes* are most lovely!

As I rode along near the coast I kept a very sharp look-out in the lanes and woods, hoping I might, at this time of the year, have discovered some of the Summer short-winged birds of passage crowding towards the coast in order for their departure: but it was very extraordinary that I never saw a redstart, white-throat, black-cap, uncrested wren, fly-catcher, &c. And I remember to have made the same remark in former years, as I usually come to this place annually about this time. The birds most common along the coast at present are the stone-chatters, whinchats, buntings, linnets, some few wheat-ears, tit-larks, &c. Swallows and house-martins abound yet, induced to prolong their stay by this soft, still, dry season.

A land tortoise, which has been kept for thirty years in a little walled court belonging to the house where I now am visiting, retires under ground about the middle of *November*, and comes forth again about the middle of *April*. When it first appears in the Spring it discovers very little inclina-

tion towards food; but in the height of Summer grows voracious: and then as the Summer declines its appetite declines; so that for the last six weeks in Autumn it hardly eats at all. Milky plants, such as lettuces, dandelions, sowthistles, are its favourite dish. In a neighbouring village one was kept till by tradition it was supposed to be an hundred years old. An instance of vast longevity in such a poor reptile!

LETTER VIII.

TO THE SAME.

DEAR SIR; SELBORNE, Dec. 20, 1770.

THE birds that I took for *aberdavines* were reed-sparrows *(passeres torquati)*.

There are, doubtless, many home internal migrations within this kingdom that want to be better understood: witness those vast

flocks of hen chaffinches that appear with us in the Winter without hardly any cocks among them. Now was there a due proportion of each sex, it should seem very improbable that any one district should produce such numbers of these little birds; and much more when only one half of the species appears: therefore we may conclude that the *fringillæ cælebes*, for some good purposes, have a peculiar migration of their own in which the sexes part. Nor should it seem so wonderful that the intercourse of sexes in this species of birds should be interrupted in Winter; since in many animals, and particularly in bucks and does, the sexes herd separately, except at the season when commerce is necessary for the continuance of the breed. For this matter of the chaffinches see *Fauna Suecica*, p. 85, and *Systema Naturæ*, p. 318. I see every Winter vast flights of hen chaffinches, but none of cocks.

Your method of accounting for the periodical motions of the *British* singing birds, or birds of flight, is a very probable one:

since the matter of food is a great regulator of the actions and proceedings of the brute creation: there is but one that can be set in competition with it, and that is love. But I cannot quite acquiesce with you in one circumstance, when you advance that, "when they have thus feasted, they again "separate into small parties of five or six, "and get the best fare they can within a "certain district, having no inducement "to go in quest of fresh-turned earth." Now if you mean that the business of congregating is quite at an end from the conclusion of wheat-sowing to the season of barley and oats, it is not the case with us; for larks and chaffinches, and particularly linnets, flock and congregate as much in the very dead of Winter as when the husbandman is busy with his ploughs and harrows.

Sure there can be no doubt but that woodcocks and fieldfares leave us in the Spring, in order to cross the seas, and to retire to some districts more suitable to the purpose of breeding. That the former pair before they retire, and that the hens are

forward with egg, I myself, when I was a sportsman, have often experienced. It cannot indeed be denied but that now and then we hear of a woodcock's nest, or young birds, discovered in some part or other of this island: but then they are always mentioned as rarities, and somewhat out of the common course of things: but as to redwings and fieldfares, no sportsman or naturalist has ever yet, that I could hear, pretended to have found the nest or young of those species in any part of these kingdoms. And I the more admire at this instance as extraordinary, since, to all appearance, the same food in Summer as well as in Winter might support them here which maintains their congeners, the blackbirds and thrushes, did they choose to stay the Summer through. From hence it appears that it is not food alone which determines some species of birds with regard to their stay or departure. Fieldfares and redwings disappear sooner or later according as the warm weather comes on earlier or later. For I

well remember, after that dreadful Winter 1739-40, that cold north-east winds continued to blow on through *April* and *May*, and that these kinds of birds (what few remained of them) did not depart as usual, but were seen lingering about till the beginning of *June*.

The best authority that we can have for the nidification of the birds above-mentioned in any district, is the testimony of faunists that have written professedly the natural history of particular countries. Now, as to the fieldfare, *Linnæus*, in his Fauna Suecica, says of it, that "*maximis in arboribus nidificat:*" and of the redwing he says, in the same place, that "*nidificat in mediis arbusculis, sive sepibus: ova sex cæruleo-viridia masculis nigris variis.*" Hence we may be assured that fieldfares and redwings breed in *Sweden*. *Scopoli* says, in his *Annus Primus*, of the woodcock, that "*nupta ad nos venit circa æquinoctium vernale:*" meaning in *Tirol*, of which he is a native. And afterwards he adds, "*nidificat in*

paludibus alpinis: ova ponit 3—5. It does not appear from *Kramer* that woodcocks breed at all in *Austria:* but he says, "*Avis* " *hæc septentrionalium provinciarum æstivo* " *tempore incola est; ubi plerumque nidificat.* " *Appropinquante hyeme australiores provin-* " *cias petit: hinc circa plenilunium mensis* " *Octobris plerumque Austriam transmigrat.* " *Tunc rursus circa plenilunium potissimum* " *mensis Martii per Austriam matrimonio* " *juncta ad septentrionales provincias redit.*" For the whole passage (which I have abridged) see *Elenchus,* &c. p. 351. This seems to be a full proof of the migration of woodcocks; though little is proved concerning the place of breeding.

P. S. There fell in the county of *Rutland,* in three weeks of this present very wet weather, seven inches and a half of rain, which is more than has fallen in any three weeks for these thirty years past in that part of the world. A mean quantity in that county for one year is twenty inches and an half.

LETTER IX.

TO THE SAME.

FYFIELD, near ANDOVER, Feb. 12, 1771.

DEAR SIR;

YOU are, I know, no great friend to migration; and the well-attested accounts from various parts of the kingdom seem to justify you in your suspicions, that at least many of the swallow kind do not leave us in the Winter, but lay themselves up like insects and bats, in a torpid state, and slumber away the more uncomfortable months till the return of the sun and fine weather awakens them.

But then we must not, I think, deny migration in general; because migration certainly does subsist in some places, as my brother in *Andalusia* has fully informed me. Of the motions of these birds he has ocular demonstration, for many weeks to-

gether, both spring and fall: during which periods myriads of the swallow kind traverse the Straits from north to south, and from south to north, according to the season. And these vast migrations consist not only of *hirundines* but of *bee-birds, hoopoes, oro pendolos,* or *golden thrushes,* &c. &c. and also of many of our *soft-billed summer birds of passage;* and moreover of birds which never leave us, such as all the various sorts of hawks and kites. Old *Belon,* two hundred years ago, gives a curious account of the incredible armies of hawks and kites which he saw in the spring-time traversing the *Thracian Bosphorus* from *Asia* to *Europe.* Besides the above-mentioned, he remarks that the procession is swelled by whole troops of eagles and vultures.

Now it is no wonder that birds residing in *Africa* should retreat before the sun as it advances, and retire to milder regions, and especially birds of prey, whose blood being heated with hot animal food, are more impatient of a sultry climate: but then I cannot help wondering why kites and hawks,

and such hardy birds as are known to defy all the severity of *England*, and even of *Sweden* and all north *Europe*, should want to migrate from the south of *Europe*, and be dissatisfied with the Winters of *Andalusia*.

It does not appear to me that much stress may be laid on the difficulty and hazard that birds must run in their migrations, by reason of vast oceans, cross winds, &c.; because, if we reflect, a bird may travel from *England* to the equator without launching out and exposing itself to boundless seas, and that by crossing the water at *Dover*, and again at *Gibraltar*. And I with the more confidence advance this obvious remark, because my brother has always found that some of his birds, and particularly the swallow kind, are very sparing of their pains in crossing the *Mediterranean*: for when arrived at *Gibraltar*, they do not

——— "Rang'd in figure wedge their way,
——— ——— "And set forth
"Their airy caravan high over seas
"Flying, and over lands with mutual wing
"Easing their flight:" MILTON.

but scout and hurry along in little detached parties of six or seven in a company; and sweeping low, just over the surface of the land and water, direct their course to the opposite continent at the narrowest passage they can find. They usually slope across the bay to the south-west, and so pass over opposite to *Tangier*, which, it seems, is the narrowest space.

In former letters we have considered whether it was probable that woodcocks in moon-shiny nights cross the *German* ocean from *Scandinavia*. As a proof that birds of less speed may pass that sea, considerable as it is, I shall relate the following incident, which, though mentioned to have happened so many years ago, was strictly matter of fact:—As some people were shooting in the parish of *Trotten*, in the county of *Sussex*, they killed a duck in that dreadful Winter 1708-9, with a silver collar about its neck,* on which were engraven the arms of the king of *Denmark*. This anec-

* I have read a like anecdote of a swan.

dote the rector of *Trotten* at that time has often told to a near relation of mine ; and, to the best of my remembrance, the collar was in the possession of the rector.

At present I do not know any body near the sea-side that will take the trouble to remark at what time of the moon woodcocks first come : if I lived near the sea myself I would soon tell you more of the matter. One thing I used to observe when I was a sportsman, that there were times in which woodcocks were so sluggish and sleepy that they would drop again when flushed just before the spaniels, nay, just at the muzzle of a gun that had been fired at them : whether this strange laziness was the effect of a recent fatiguing journey I shall not presume to say.

Nightingales not only never reach *Northumberland* and *Scotland,* but also as I have been always told, *Devonshire* and *Cornwall.* In those two last counties we cannot attribute the failure of them to the want of warmth : the defect in the west is rather a presumptive argument that these birds

come over to us from the continent at the narrowest passage, and do not stroll so far westward.

Let me hear from your own observation whether skylarks do not dust. I think they do: and if they do, whether they wash also.

The *alauda pratensis* of *Ray* was the poor dupe that was educating the booby of a cuckoo mentioned in my letter of *October* last.

Your letter came too late for me to procure a ring-ousel for Mr. *Tunstal* during their autumnal visit; but I will endeavour to get him one when they call on us again in *April*. I am glad that you and that gentleman saw my *Andalusian* birds; I hope they answered your expectation. *Royston*, or grey crows, are Winter birds that come much about the same time with the woodcock: they, like the fieldfare and red wing, have no apparent reason for migration: for as they fare in the Winter like their congeners, so might they, in all appearance, in the Summer. Was not *Tenant*, when a boy,

mistaken? did he not find a missel-thrush's nest, and take it for the nest of a field-fare?

The stock-dove, or wood-pigeon, *œnas Raii*, is the last Winter bird of passage which appears with us; and is not seen till towards the end of *November:* about twenty years ago they abounded in the district of *Selborne;* and strings of them were seen morning and evening that reached a mile or more: but since the beechen woods have been greatly thinned, they are much decreased in number. The ring-dove, *palumbus Raii*, stays with us the whole year, and breeds several times through the Summer.

Before I received your letter of *October* last I had just remarked in my journal that the trees were unusually green. This uncommon verdure lasted on late into *November;* and may be accounted for from a late Spring, a cool and moist Summer; but more particularly from vast armies of chafers, or tree-beetles, which, in many places, reduced whole woods to a leafless naked state. These trees shot again at *Midsummer*, and

then retained their foliage till very late in the year.

My musical friend, at whose house I am now visiting, has tried all the owls that are his near neighbours with a pitch-pipe set at concert-pitch, and finds they all hoot in B flat. He will examine the nightingales next Spring.

I am, &c. &c.

LETTER X.

TO THE SAME.

DEAR SIR; SELBORNE, Aug. 1, 1771.

FROM what follows, it will appear that neither owls nor cuckoos keep to one note. A friend remarks that many (most) of his owls hoot in B flat; but that one went almost half a note below A. The pipe he tried their notes by was a common half-crown pitch-pipe, such as masters use for

tuning of harpsichords; it was the common *London* pitch.

A neighbour of mine, who is said to have a nice ear, remarks that the owls about this village hoot in three different keys, in G flat, or F sharp, in B flat and A flat. He heard two hooting to each other, the one in A flat, and the other in B flat. *Query:* Do these different notes proceed from different species, or only from various individuals? The same person finds upon trial that the note of the cuckoo (of which we have but one species) varies in different individuals; for, about *Selborne* wood, he found they were mostly in D: he heard two sing together, the one in D, the other in D sharp, who made a disagreeable concert: he afterwards heard one in D sharp, and about *Woolmer-forest* some in C. As to nightingales, he says that their notes are so short, and their transitions so rapid, that he cannot well ascertain their key. Perhaps in a cage and in a room, their notes may be more distinguishable. This person has tried to settle the notes of a swift, and of

several other small birds, but cannot bring them to any criterion.

As I have often remarked that redwings are some of the first birds that suffer with us in severe weather, it is no wonder at all that they retreat from *Scandinavian* Winters: and much more the *ordo* of *grallæ*, who all, to a bird, forsake the northern parts of *Europe* at the approach of Winter. "*Grallæ* "*tanquam conjuratæ unanimiter in fugam se* "*conjiciunt; ne earum unicam quidem inter* "*nos habitantem invenire possimus; ut enim* "*æstate in australibus degere nequeunt ob* "*defectum lumbricorum, terramque siccam;* "*ita nec in frigidis ob eandem causam,*" says *Ekmarck* the *Swede*, in his ingenious little treatise called *Migrationes Avium*, which by all means you ought to read while your thoughts run on the subject of migration. See *Amœnitates Academicæ*, vol. iv. p. 565.

Birds may be so circumstanced as to be obliged to migrate in one country and not in another: but the *grallæ* (which procure their food from marshes and boggy ground) must in Winter forsake the more

northerly parts of *Europe,* or perish for want of food.

I am glad you are making inquiries from *Linnæus* concerning the woodcock: it is expected of him that he should be able to account for the motions and manner of life of the animals of his own *Fauna.*

Faunists, as you observe, are too apt to acquiesce in bare descriptions, and a few synonyms: the reason is plain: because all that may be done at home in a man's study, but the investigation of the life and conversation of animals, is a concern of much more trouble and difficulty, and is not to be attained but by the active and inquisitive, and by those that reside much in the country.

Foreign systematics, are, I observe, much too vague in their specific differences; which are almost universally constituted by one or two particular marks, the rest of the description running in general terms. But our countryman, the excellent Mr. *Ray,* is the only describer that conveys some precise idea in every term or word, maintain-

ing his superiority over his followers and imitators in spite of the advantages of fresh discoveries and modern information.

At this distance of years it is not in my power to recollect at what periods woodcocks used to be sluggish or alert when I was a sportsman: but, upon my mentioning this circumstance to a friend, he thinks he has observed them to be remarkably listless against snowy foul weather: if this should be the case, then the inaptitude for flying arises only from an eagerness for food; as sheep are observed to be very intent on grazing against stormy wet evenings.

I am, &c. &c.

LETTER XI.

TO THE SAME.

DEAR SIR; SELBORNE, Feb. 8, 1772.

WHEN I ride about in the Winter, and see such prodigious flocks of various kinds of birds, I cannot help admiring at these con-

gregations, and wishing that it was in my power to account for those appearances almost peculiar to the season. The two great motives which regulate the proceedings of the brute creation are love and hunger; the former incites animals to perpetuate their kind, the latter induces them to preserve individuals: whether either of these should seem to be the ruling passion in the matter of congregating is to be considered. As to love, that is out of the question at a time of the year when that soft passion is not indulged; besides, during the amorous season, such a jealousy prevails between the male birds, that they can hardly bear to be together in the same hedge or field. Most of the singing and elation of spirits of that time seem to me to be the effect of rivalry and emulation: and it is to this spirit of jealousy that I chiefly attribute the equal dispersion of birds in the Spring over the face of the country.

Now as to the business of food: as these animals are actuated by instinct to hunt for necessary food, they should not, one would

suppose, crowd together in pursuit of sustenance at a time when it is most likely to fail; yet such associations do take place in hard weather chiefly, and thicken as the severity increases. As some kind of self-interest, and self-defence is no doubt the motive for the proceeding, may it not arise from the helplessness of their state in such rigorous seasons; as men crowd together, when under great calamities, though they know not why? Perhaps approximation may dispel some degree of cold; and a crowd may make each individual appear safer from the ravages of birds of prey and other dangers.

If I admire when I see how much congenerous birds love to congregate, I am the more struck when I see incongruous ones in such strict amity. If we do not much wonder to see a flock of rooks usually attended by a train of daws, yet it is strange that the former should so frequently have a flight of starlings for their satellites. Is it because rooks have a more discerning scent than their attendants, and can lead them to

spots more productive of food? Anatomists say that rooks, by reason of two large nerves which run down between the eyes into the upper mandible, have a more delicate feeling in their beaks than other round-billed birds, and can grope for their meat when out of sight. Perhaps, then, their associates attend them on the motives of interest, as greyhounds wait on the motions of their finders; and as lions are said to do on the yelpings of jackals. Lapwings and starlings sometimes associate.

LETTER XII.

TO THE SAME.

DEAR SIR; March 9, 1772.

As a gentleman and myself were walking on the fourth of last *November* round the sea-banks at *Newhaven*, near the mouth of the *Lewes* river, in pursuit of natural know-

ledge, we were surprised to see three house-swallows gliding very swiftly by us. That morning was rather chilly, with the wind at north-west; but the tenor of the weather for some time before had been delicate, and the noons remarkably warm. From this incident, and from repeated accounts which I meet with, I am more and more induced to believe that many of the swallow kind do not depart from this island; but lay themselves up in holes and caverns; and do, insect-like and bat-like, come forth at mild times, and then retire again to their *latebræ*. Nor make I the least doubt but that, if I lived at *Newhaven*, *Seaford*, *Brighthelmstone*, or any of those towns near the chalk-cliffs of the *Sussex* coast, by proper observations, I should see swallows stirring at periods of the Winter, when the noons were soft and inviting, and the sun warm and invigorating. And I am the more of this opinion from what I have remarked during some of our late Springs, that though some swallows did make their appearance about the usual time, *viz.* the

thirteenth or fourteenth of *April*, yet, meeting with an harsh reception, and blustering cold north-east winds, they immediately withdrew, absconding for several days, till the weather gave them better encouragement.

LETTER XIII.

TO THE SAME.

DEAR SIR; April 12, 1772.

WHILE I was in *Sussex* last Autumn my residence was at the village near *Lewes*, from whence I had formerly the pleasure of writing to you. On the first of *November* I remarked that the old tortoise, formerly mentioned, began first to dig the ground in order to the forming of its hybernaculum, which it had fixed on just beside a great tuft of hepaticas. It scrapes out the ground with its fore-feet, and throws it up over its back with its hind; but the mo-

tion of its legs is ridiculously slow, little exceeding the hour-hand of a clock; and suitable to the composure of an animal said to be a whole month in performing one feat of copulation. Nothing can be more assiduous than this creature night and day in scooping the earth, and forcing its great body into the cavity; but, as the noons of that season proved unusually warm and sunny, it was continually interrupted, and called forth, by the heat in the middle of the day; and though I continued there till the thirteenth of *November*, yet the work remained unfinished. Harsher weather, and frosty mornings, would have quickened its operations. No part of its behaviour ever struck me more than the extreme timidity it always expresses with regard to rain; for though it has a shell that would secure it against the wheel of a loaded cart, yet does it discover as much solicitude about rain as a lady dressed in all her best attire, shuffling away on the first sprinklings, and running its head up in a corner. If at-

tended to, it becomes an excellent weather-glass; for as sure as it walks elate, and as it were on tiptoe, feeding with great earnestness in a morning, so sure will it rain before night. It is totally a diurnal animal, and never pretends to stir after it becomes dark. The tortoise, like other reptiles, has an arbitrary stomach as well as lungs; and can refrain from eating as well as breathing for a great part of the year. When first awakened it eats nothing; nor again in the Autumn before it retires: through the height of the Summer it feeds voraciously, devouring all the food that comes in its way. I was much taken with its sagacity in discerning those that do it kind offices: for, as soon as the good old lady comes in sight who has waited on it for more than thirty years, it hobbles towards its benefactress with awkward alacrity: but remains inattentive to strangers. Thus not only "*the ox knoweth his owner, and the ass his master's crib,*"* but the most abject reptile

* Isaiah i. 3.

and torpid of beings distinguishes the hand that feeds it, and is touched with the feelings of gratitude! I am, &c. &c.

P. S. In about three days after I left *Sussex* the tortoise retired into the ground under the hepatica.

LETTER XIV.

TO THE SAME.

DEAR SIR; SELBORNE, March 26, 1773.

THE more I reflect on the στοργὴ of animals, the more I am astonished at its effects. Nor is the violence of this affection more wonderful than the shortness of its duration. Thus every hen is in her turn the virago of the yard, in proportion to the helplessness of her brood; and will fly in the face of a dog or a sow in defence of those chickens, which in a few weeks she will drive before her with relentless cruelty.

This affection sublimes the passions, quickens the invention and sharpens the sagacity of the brute creation. Thus an hen, just become a mother, is no longer that placid bird she used to be, but with feathers standing on end, wings hovering, and clucking note, she runs about like one possessed. Dams will throw themselves in the way of the greatest danger in order to avert it from their progeny. Thus a partridge will tumble along before a sportsman in order to draw away the dogs from her helpless covey. In the time of nidification the most feeble birds will assault the most rapacious. All the hirundines of a village are up in arms at the sight of an hawk, whom they will persecute till he leaves that district. A very exact observer has often remarked that a pair of ravens nesting in the rock of *Gibraltar* would suffer no vulture or eagle to rest near their station, but would drive them from the hill with an amazing fury: even the blue thrush at the season of breeding would dart out from the clefts of the rocks to chase away the kestril,

or the sparrow-hawk. If you stand near the nest of a bird that has young, she will not be induced to betray them by an inadvertent fondness, but will wait about at a distance with meat in her mouth for an hour together,.

Should I farther corroborate what I have advanced above by some anecdotes which I probably may have mentioned before in conversation, yet you will, I trust, pardon the repetition for the sake of the illustration.

The fly-catcher of the Zoology (the *stoparola* of *Ray)* builds every year in the vines that grow on the walls of my house. A pair of these little birds had one year inadvertently placed their nest on a naked bough, perhaps in a shady time, not being aware of the inconvenience that followed. But an hot sunny season coming on before the brood was half fledged, the reflection of the wall became insupportable, and must inevitably have destroyed the tender young, had not affection suggested an expedient, and prompted the parent-birds to hover

over the nest all the hotter hours, while with wings expanded, and mouths gaping for breath, they screened off the heat from their suffering offspring.

A farther instance I once saw of notable sagacity in a willow-wren, which had built in a bank in my fields. This bird a friend and myself had observed as she sat in her nest; but were particularly careful not to disturb her, though we saw she eyed us with some degree of jealousy. Some days after, as we passed that way, we were desirous of remarking how this brood went on; but no nest could be found, till I happened to take up a large bundle of long green moss, as it were, carelessly thrown over the nest, in order to dodge the eye of any impertinent intruder.

A still more remarkable mixture of sagacity and instinct occurred to me one day as my people were pulling off the lining of an hotbed, in order to add some fresh dung. From out of the side of this bed leaped an animal with great agility that made a most grotesque figure; nor was it without great

difficulty that it could be taken; when it proved to be a large white-bellied field-mouse with three or four young clinging to her teats by their mouths and feet. It was amazing that the desultory and rapid motions of this dam should not oblige her litter to quit their hold, especially when it appeared that they were so young as to be both naked and blind!

To these instances of tender attachment, many more of which might be daily discovered by those that are studious of nature, may be opposed that rage of affection, that monstrous perversion of the στοργὴ, which induces some females of the brute creation to devour their young because their owners have handled them too freely, or removed them from place to place! Swine, and sometimes the more gentle race of dogs and cats, are guilty of this horrid and preposterous murder. When I hear now and then of an abandoned mother that destroys her offspring, I am not so much amazed; since reason perverted, and the bad passions let loose, are capable of any enormity: but

why the parental feelings of brutes, that usually flow in one most uniform tenor, should sometimes be so extravagantly diverted, I leave to abler philosophers than myself to determine.

I am, &c.

LETTER XV.

TO THE SAME.

DEAR SIR; SELBORNE, July 8, 1773.

SOME young men went down lately to a pond on the verge of *Wolmer-forest* to hunt flappers, or young wild-ducks, many of which they caught, and, among the rest, some very minute yet well-fledged wild-fowls alive, which upon examination I found to be teals. I did not know till then that teals ever bred in the south of *England*, and was much pleased with the discovery: this I look upon as a great stroke in natural history.

We have had, ever since I can remember, a pair of white owls that constantly breed under the eaves of this church. As I have paid good attention to the manner of life of these birds during their season of breeding, which lasts the Summer through, the following remarks may not perhaps be unacceptable :—About an hour before sunset (for then the mice begin to run) they sally forth in quest of prey, and hunt all round the hedges of meadows and small enclosures for them, which seem to be their only food. In this irregular country we can stand on an eminence and see them beat the fields over like a setting-dog, and often drop down in the grass or corn. I have minuted these birds with my watch for an hour together, and have found that they return to their nest, the one or the other of them, about once in five minutes ; reflecting at the same time on the adroitness that every animal is possessed of as far as regards the well-being of itself and offspring. But a piece of address, which they show when they return loaded, should

not, I think, be passed over in silence.—As they take their prey with their claws, so they carry it in their claws to their nest: but, as the feet are necessary in their ascent under the tiles, they constantly perch first on the roof of the chancel, and shift the mouse from their claws to their bill, that the feet may be at liberty to take hold of the plate on the wall as they are rising under the eaves.

White owls seem not (but in this I am not positive) to hoot at all; all that clamorous hooting appears to me to come from the wood kinds. The white owl does indeed snore and hiss in a tremendous manner; and these menaces well answer the intention of intimidating: for I have known a whole village up in arms on such an occasion, imagining the church-yard to be full of goblins and spectres. White owls also often scream horribly as they fly along; from this screaming probably arose the common people's imaginary species of *screech-owl*, which they superstitiously think attends the windows of dying persons. The

plumage of the remiges of the wings of every species of owl that I have yet examined is remarkably soft and pliant. Perhaps it may be necessary that the wings of these birds should not make much resistance or rushing, that they may be enabled to steal through the air unheard upon a nimble and watchful quarry.

While I am talking of owls, it may not be improper to mention what I was told by a gentleman of the county of *Wilts*. As they were grubbing a vast hollow pollard-ash that had been the mansion of owls for centuries, he discovered at the bottom a mass of matter that at first he could not account for. After some examination, he found that it was a congeries of the bones of mice (and perhaps of birds and bats) that had been heaping together for ages, being cast up in pellets out of the crops of many generations of inhabitants. For owls cast up the bones, fur, and feathers of what they devour, after the manner of hawks. He believes, he told me, that there were bushels of this kind of substance.

When brown owls hoot, their throats swell as big as an hen's egg. I have known an owl of this species live a full year without any water. Perhaps the case may be the same with all birds of prey. When owls fly they stretch out their legs behind them as a balance to their large heavy heads: for as most nocturnal birds have large eyes and ears they must have large heads to contain them Large eyes I presume are necessary to collect every ray of light, and large concave ears to command the smallest degree of sound or noise.

I am, &c.

It will be proper to premise here that the sixteenth, eighteenth, twentieth, and twenty-first letters have been published already in the Philosophical Transactions: but as nicer observation has furnished several corrections and additions, it is hoped that the re-publication of them will not give offence; especially as these sheets would be very imperfect without them, and as they will be new to many readers who had no opportunity of seeing them when they made their first appearance.

The *hirundines* are a most inoffensive, harmless, entertaining, social, and useful tribe of birds: they touch no fruit in our gardens; delight, all except one species, in attaching themselves to our houses; amuse us with their migrations, songs, and marvellous agility; and clear our outlets from the annoyances of gnats and other troublesome insects. Some districts in the South seas, near *Guiaquil*,* are desolated, it seems, by the infinite swarms of venomous mosquitoes, which fill the air, and render those coasts insupportable. It would be worth inquiring whether any species of *hirundines* is found in those regions. Whoever contemplates the myriads of insects that sport in the sun-beams of a Summer evening in this country, will soon be convinced to what a degree our atmosphere would be choaked with them was it not for the friendly interposition of the swallow tribe.

Many species of birds have their peculiar *lice;* but the *hirundines* alone seem to be

* See *Ulloa*'s Travels.

annoyed with *dipterous* insects, which infest every species, and are so large, in proportion to themselves, that they must be extremely irksome and injurious to them. These are the *hippoboscæ hirundines*, with narrow subulated wings, abounding in every nest; and are hatched by the warmth of the bird's own body during incubation, and crawl about under its feathers.

A *species* of them is familiar to horsemen in the south of *England* under the name of *forest-fly*; and to some of *side-fly*, from its running sideways like a crab. It creeps under the tails, and about the groins, of horses, which, at their first coming out of the north, are rendered half frantic by the tickling sensation; while our own breed little regards them.

The curious *Reaumur* discovered the large eggs, or rather *pupæ*, of these flies as big as the flies themselves, which he hatched in his own bosom. Any person that will take the trouble to examine the old nests of either species of swallows may find in them the black shining cases or skins of the *pupæ*

of these insects: but for other particulars, too long for this place, we refer the reader to *l'Histoire d'Insectes* of that admirable entomologist. Tom. iv. pl. 11.

LETTER XVI.

TO THE SAME.

DEAR SIR; SELBORNE, Nov. 20, 1773.

IN obedience to your injunctions I sit down to give you some account of the house-martin, or martlet; and, if my monography of this little domestic and familiar bird should happen to meet with your approbation, I may probably soon extend my inquiries to the rest of the *British hirundines*—the swallow, the swift, and the bank-martin.

A few house-martins begin to appear about the sixteenth of *April*; usually some

few days later than the swallow. For some time after they appear, the hirundines in general pay no attention to the business of nidification, but play and sport about, either to recruit from the fatigue of their journey, if they do migrate at all, or else that their blood may recover its true tone and texture after it has been so long benumbed by the severities of Winter. About the middle of *May*, if the weather be fine, the martin begins to think in earnest of providing a mansion for its family. The crust or shell of this nest seems to be formed of such dirt or loam as comes most readily to hand, and is tempered and wrought together with little bits of broken straws to render it tough and tenacious. As this bird often builds against a perpendicular wall without any projecting ledge under, it requires its utmost efforts to get the first foundation firmly fixed, so that it may safely carry the superstructure. On this occasion the bird not only clings with its claws, but partly supports itself by strongly inclining its tail against the wall, making

that a fulcrum; and thus steadied, it works and plasters the materials into the face of the brick or stone. But then, that this work may not, while it is soft and green, pull itself down by its own weight, the provident architect has prudence and forbearance enough not to advance her work too fast; but by building only in the morning, and by dedicating the rest of the day to food and amusement, gives it sufficient time to dry and harden. About half an inch seems to be a sufficient layer for a day. Thus careful workmen when they build mud-walls (informed at first perhaps by this little bird) raise but a moderate layer at a time, and then desist; lest the work should become top-heavy, and so be ruined by its own weight. By this method in about ten or twelve days is formed an hemispheric nest with a small aperture towards the top, strong, compact and warm; and perfectly fitted for all the purposes for which it was intended. But then nothing is more common than for the house-sparrow, as soon as the shell is finished, to seize

on it as its own, to eject the owner, and to line it after its own manner.

After so much labour is bestowed in erecting a mansion, as Nature seldom works in vain, martins will breed on for several years together in the same nest, where it happens to be well sheltered and secure from the injuries of weather. The shell or crust of the nest is a sort of rustic-work full of knobs and protuberances on the outside: nor is the inside of those that I have examined smoothed with any exactness at all; but is rendered soft and warm, and fit for incubation, by a lining of small straws, grasses, and feathers; and sometimes by a bed of moss interwoven with wool. In this nest they tread, or engender, frequently during the time of building; and the hen lays from three to five white eggs.

At first when the young are hatched, and are in a naked and helpless condition, the parent birds, with tender assiduity, carry out what comes away from their young. Was it not for this affectionate cleanliness the nestlings would soon be burnt up, and

destroyed in so deep and hollow a nest, by their own caustic excrement. In the quadruped creation the same neat precaution is made use of; particularly among dogs and cats, where the dams lick away what proceeds from their young. But in birds there seems to be a particular provision, that the dung of nestlings is enveloped in a tough kind of jelly, and therefore is the easier conveyed off without soiling or daubing. Yet, as Nature is cleanly in all her ways, the young perform this office for themselves in a little time by thrusting their tails out at the aperture of their nest. As the young of small birds presently arrive at their ἡλικία, or full growth, they soon become impatient of confinement, and sit all day with their heads out at the orifice, where the dams by clinging to the nest, supply them with food from morning to night. For a time the young are fed on the wing by their parents; but the feat is done by so quick and almost imperceptible a slight, that a person must have attended very exactly to their motions before he would be able to

perceive it. As soon as the young are able to shift for themselves, the dams immediately turn their thoughts to the business of a second brood: while the first flight, shaken off and rejected by their nurses, congregate in great flocks, and are the birds that are seen clustering and hovering on sunny mornings and evenings round towers and steeples, and on the roofs of churches and houses. These congregatings usually begin to take place about the first week in *August;* and therefore we may conclude that by that time the first flight is pretty well over. The young of this species do not quit their abodes all together; but the more forward birds get abroad some days before the rest. These, approaching the eaves of buildings, and playing about before them, make people think that several old ones attend one nest. They are often capricious in fixing on a nesting-place, beginning many edifices, and leaving them unfinished; but when once a nest is completed in a sheltered place, it serves for several seasons. Those which breed in a

ready-finished house get the start, in hatching, of those that build new, by ten days or a fortnight. These industrious artificers are at their labours in the long days before four in the morning: when they fix their materials they plaster them on with their chins, moving their heads with a quick vibratory motion. They dip and wash as they fly sometimes in very hot weather, but not so frequently as swallows. It has been observed that martins usually build to a north-east or north-west aspect, that the heat of the sun may not crack and destroy their nests: but instances are also remembered where they bred for many years in vast abundance in an hot stifled inn-yard, against a wall facing to the south.

Birds in general are wise in their choice of situation: but in this neighbourhood, every Summer, is seen a strong proof to the contrary at an house without eaves in an exposed district, where some martins build year by year in the corners of the windows. But, as the corners of these windows (which face to the south-east and

south-west) are too shallow, the nests are washed down every hard rain; and yet these birds drudge on to no purpose from Summer to Summer, without changing their aspect or house. It is a piteous sight to see them labouring when half their nest is washed away and bringing dirt—"*generis lapsi sarcire ruinas.*" Thus is instinct a most wonderful unequal faculty; in some instances so much above reason, in other respects so far below it! Martins love to frequent towns, especially if there are great lakes and rivers at hand; nay they even affect the close air of *London.* And I have not only seen them nesting in the *Borough,* but even in the *Strand* and *Fleet-street;* but then it was obvious from the dinginess of their aspect that their feathers partook of the filth of that sooty atmosphere. Martins are by far the least agile of the four species; their wings and tails are short, and therefore they are not capable of such surprising turns and quick and glancing evolutions as the swallow. Accordingly they make use of a placid easy motion in

a middle region of the air, seldom mounting to any great height, and never sweeping long together over the surface of the ground or water. They do not wander far for food, but affect sheltered districts, over some lake, or under some hanging wood, or in some hollow vale, especially in windy weather. They breed the latest of all the swallow kind: in 1772 they had nestlings on to *October* the twenty-first, and are never without unfledged young as late as *Michaelmas*.

As the Summer declines the congregating flocks increase in numbers daily by the constant accession of the second broods; till at last they swarm in myriads upon myriads round the villages on the *Thames*, darkening the face of the sky as they frequent the aits of that river, where they roost. They retire, the bulk of them I mean, in vast flocks together about the beginning of *October*: but have appeared of late years in a considerable flight in this neighbourhood, for one day or two, as late as *November* the third and sixth, after

hey were supposed to have been gone for more than a fortnight. They therefore withdraw with us the latest of any species. Unless these birds are very short-lived indeed, or unless they do not return to the district where they are bred, they must undergo vast devastations some how, and some where; for the birds that return yearly bear no manner of proportion to the birds that retire.

House-martins are distinguished from their congeners by having their legs covered with soft downy feathers down to their toes. They are no songsters; but twitter in a pretty inward soft manner in their nests. During the time of breeding they are often greatly molested with fleas.

I am, &c.

LETTER XVII.

TO THE SAME.

DEAR SIR; RINGMER near LEWES, Dec. 9, 1773.

I RECEIVED your last favour just as I was setting out for this place; and am pleased to find that my monography met with your approbation. My remarks are the result of many years observation; and are, I trust, true in the whole: though I do not pretend to say that they are perfectly void of mistake, or that a more nice observer might not make many additions, since subjects of this kind are inexhaustible.

If you think my letter worthy the notice of your respectable society, you are at liberty to lay it before them; and they will consider it, I hope, as it was intended, as an humble attempt to promote a more minute inquiry into natural history; into the

life and conversation of animals. Perhaps hereafter I may be induced to take the house-swallow under consideration; and from that proceed to the rest of the *British hirundines.*

Though I have now travelled the *Sussex downs* upwards of thirty years, yet I still investigate that chain of majestic mountains with fresh admiration year by year; and think I see new beauties every time I traverse it. This range, which runs from *Chichester* eastward as far as *East-Bourn,* is about sixty miles in length, and is called *The South Downs,* properly speaking, only round *Lewes.* As you pass along you command a noble view of the wild, or weald, on one hand, and the broad downs and sea on the other. Mr. *Ray* used to visit a family* just at the foot of these hills, and was so ravished with the prospect from *Plumpton-plain* near *Lewes,* that he mentions those scapes in his "Wisdom of God in the Works of the Creation" with the utmost satisfaction, and thinks them equal

* Mr. *Courthope,* of *Danny.*

to any thing he had seen in the finest parts of *Europe*.

For my own part, I think there is somewhat peculiarly sweet and amusing in the shapely-figured aspect of chalk-hills in preference to those of stone, which are rugged, broken, abrupt, and shapeless.

Perhaps I may be singular in my opinion, and not so happy as to convey to you the same idea; but I never contemplate these mountains without thinking I perceive somewhat analogous to growth in their gentle swellings and smooth fungus-like protuberances, their fluted sides, and regular hollows and slopes, that carry at once the air of vegetative dilatation and expansion ——Or was there ever a time when these immense masses of calcarious matter were thrown into fermentation by some adventitious moisture; were raised and leavened into such shapes by some plastic power; and so made to swell and heave their broad backs into the sky so much above the less animated clay of the wild below?

By what I can guess from the admeasure-

ments of the hills that have been taken round my house, I should suppose that these hills surmount the wild at an average at about the rate of five hundred feet.

One thing is very remarkable as to the sheep; from the westward till you get to the river *Adur* all the flocks have horns, and smooth white faces, and white legs; and a hornless sheep is rarely to be seen: but as soon as you pass that river eastward, and mount *Beeding-hill*, all the flocks at once become hornless, or, as they call them, poll-sheep; and have moreover black faces with a white tuft of wool on their foreheads, and speckled and spotted legs: so that you would think that the flocks of *Laban* were pasturing on one side of the stream, and the variegated breed of his son-in-law *Jacob* were cantoned along on the other. And this diversity holds good respectively on each side from the valley of *Bramber* and *Beeding* to the eastward, and westward all the whole length of the downs. If you talk with the shepherds on this subject, they tell you that the case has been

so from time immemorial: and smile at your simplicity if you ask them whether the situation of these two different breeds might not be reversed. (However, an intelligent friend of mine near *Chichester* is determined to try the experiment; and has this Autumn, at the hazard of being laughed at, introduced a parcel of black-faced hornless rams among his horned western ewes.) The black-faced poll sheep have the shortest legs and the finest wool.

As I had hardly ever before travelled these downs at so late a season of the year, I was determined to keep as sharp a look-out as possible so near the southern coast, with respect to the Summer short-winged birds of passage. We make great inquiries concerning the withdrawing of the swallow kind without examining enough into the causes why *this tribe* is never to be seen in Winter; for, *entre nous*, the disappearing of the latter is more marvellous than that of the former, and much more unaccountable. The *hirundines*, if they please, are certainly capable of migration; and yet, no doubt,

are often found in a torpid state: but redstarts, nightingales, white-throats, blackcaps, &c. &c. are very ill-provided for long flights; have never been once found, as I ever heard of, in a torpid state, and yet can never be supposed, in such troops, from year to year to dodge and elude the eyes of the curious and inquisitive, which from day to day discern the other small birds that are known to abide our winters. But, notwithstanding all my care, I saw nothing like a Summer bird of passage: and what is more strange, not one wheat-ear, though they abound so in the Autumn as to be a considerable perquisite to the shepherds that take them; and though many are to be seen to my knowledge all the Winter through in many parts of the south of *England*. The most intelligent shepherds tell me that some few of these birds appear on the downs in *March*, and then withdraw to breed, probably, in warrens and stone-quarries: now and then a nest is plowed up in a fallow on the downs under a furrow, but it is thought a rarity. At the time of wheat-

harvest they begin to be taken in great numbers; are sent for sale in vast quantities to *Brighthelmstone* and *Tunbridge;* and appear at the tables of all the gentry that entertain with any degree of elegance. About *Michaelmas* they retire, and are seen no more till *March.* Though these birds are, when in season, in great plenty on the South downs round *Lewes,* yet at *East-Bourn,* which is the eastern extremity of those downs, they abound much more. One thing is very remarkable—that though in the height of the season so many hundreds of dozens are taken, yet they never are seen to flock; and it is a rare thing to see more than three or four at a time: so that there must be a perpetual flitting and constant progressive succession. It does not appear that any wheat-ears are taken to the westward of *Houghton-bridge,* which stands on the river *Arun.*

I did not fail to look particularly after my new migration of *ring-ousels;* and to take notice whether they continued on the downs to this season of the year; as I had

formerly remarked them in the month of *October* all the way from *Chichester* to *Lewes* wherever there were any shrubs and covert: but not one bird of this sort came within my observation. I only saw a few *larks* and *whin-chats,* some *rooks,* and several *kites* and *buzzards.*

About *Midsummer* a flight of *cross-bills* comes to the pine-groves about this house, but never makes any long stay.

The old tortoise, that I have mentioned in a former letter, still continues in this garden; and retired under ground about the twentieth of *November,* and came out again for one day on the thirtieth: it lies now buried in a wet swampy border under a wall facing to the south, and is enveloped at present in mud and mire!

Here is a large rookery round this house, the inhabitants of which seem to get their livelihood very easily; for they spend the greatest part of the day on their nest-trees when the weather is mild. These rooks retire every evening all the Winter from this rookery, where they only call by the

way, as they are going to roost in deep woods: at the dawn of day they always revisit their nest-trees, and are preceded a few minutes by a flight of daws, that act, as it were, as their harbingers.

I am, &c.

LETTER XVIII.

TO THE SAME.

DEAR SIR; SELBORNE, Jan. 29, 1774.

THE house swallow, or chimney-swallow, is, undoubtedly, the first comer of all the *British hirundines;* and appears in general on or about the thirteenth of *April,* as I have remarked from many years observation. Not but now and then a straggler is seen much earlier: and, in particular, when I was a boy I observed a swallow for a whole day together on a sunny warm *Shrove Tuesday;* which day could not fall

out later than the middle of *March*, and often happened early in *February*.

It was worth remarking that these birds are seen first about lakes and mill-ponds; and it is also very particular, that if these early visitors happen to find frost and snow, as was the case of the two dreadful Springs of 1770 and 1771, they immediately withdraw for a time. A circumstance this, much more in favour of hiding than migration; since it is much more probable that a bird should retire to its hybernaculum just at hand, than return for a week or two only to warmer latitudes.

The swallow, though called the chimney-swallow by no means builds altogether in chimnies, but often within barns and outhouses against the rafters and so she did in *Virgil*'s time.

——————" Antè
" Garrula quàm tignis nidos suspendat hirundo."

In *Sweden* she builds in barns, and is called *ladu swala*, the barn-swallow. Be-

sides, in the warmer parts of *Europe* there are no chimnies to houses, except they are *English-built:* in these countries she constructs her nest in porches, and gate-ways, and galleries, and open halls.

Here and there a bird may affect some odd, peculiar place; as we have known a swallow build down the shaft of an old well, through which chalk had been formerly drawn up for the purpose of manure: but in general with us this *hirundo* breeds in chimnies; and loves to haunt those stacks where there is a constant fire, no doubt for the sake of warmth. Not that it can subsist in the immediate shaft where there is a fire; but prefers one adjoining to that of the kitchen, and disregards the perpetual smoke of that funnel, as I have often observed with some degree of wonder.

Five or six or more feet down the chimney does this little bird begin to form her nest about the middle of *May*, which consists, like that of the house-martin, of a crust or shell composed of dirt or mud, mixed with short pieces of straw, to render

it tough and permanent; with this difference, that whereas the shell of the martin is nearly hemispheric, that of the swallow is open at the top, and like half a deep dish: this nest is lined with fine grasses, and feathers which are often collected as they float in the air.

Wonderful is the address which this adroit bird shows all day long in ascending and descending with security through so narrow a pass. When hovering over the mouth of the funnel, the vibrations of her wings acting on the confined air occasion a rumbling like thunder. It is not improbable that the dam submits to this inconvenient situation so low in the shaft, in order to secure her broods from rapacious birds, and particularly from owls, which frequently fall down chimnies, perhaps in attempting to get at these nestlings.

The swallow lays from four to six white eggs, dotted with red specks; and brings out her first brood about the last week in *June*, or the first week in *July*. The progressive method by which the young are

introduced into life is very amusing: first, they emerge from the shaft with difficulty enough, and often fall down into the rooms below: for a day or so they are fed on the chimney-top, and then are conducted to the dead leafless bough of some tree, where, sitting in a row, they are attended with great assiduity, and may then be called *perchers*. In a day or two more they become *flyers*, but are still unable to take their own food; therefore they play about near the place where the dams are hawking for flies; and, when a mouthful is collected, at a certain signal given, the dam and the nestling advance, rising towards each other, and meeting at an angle; the young one all the while uttering such a little quick note of gratitude and complacency, that a person must have paid very little regard to the wonders of Nature that has not often remarked this feat.

The dam betakes herself immediately to the busines of a second brood as soon as she is disengaged from her first; which at once associates with the first broods of *house-*

martins; and with them congregates clustering on sunny roofs, towers, and trees. This hirundo brings out her second brood towards the middle and end of *August.*

All the Summer long is the swallow a most instructive pattern of unwearied industry and affection; for, from morning to night, while there is a family to be supported, she spends the whole day in skimming close to the ground, and exerting the most sudden turns and quick evolutions. Avenues, and long walks under hedges, and pasture-fields, and mown meadows where cattle graze, are her delight, especially if there are trees interspersed; because in such spots insects most abound. When a fly is taken a smart snap from her bill is heard, resembling the noise at the shutting of a watch-case; but the motion of the mandibles is too quick for the eye.

The swallow, probably the male bird is the *excubitor* to house-martins, and other little birds, announcing the approach of birds of prey. For as soon as an hawk appears, with a shrill alarming note he calls

all the swallows and martins about him; who pursue in a body, and buffet and strike their enemy till they have driven him from the village, darting down from above on his back, and rising in a perpendicular line in perfect security. This bird also will sound the alarm, and strike at cats when they climb on the roofs of houses, or otherwise approach the nests. Each species of hirundo drinks as it flies along, sipping the surface of the water; but the swallow alone, in general, *washes* on the wing, by dropping into a pool for many times together: in very hot weather house-martins and bank-martins dip and wash a little.

The swallow is a delicate songster, and in soft sunny weather sings both perching and flying; on trees in a kind of concert, and on chimney tops: is also a bold flyer, ranging to distant downs and commons even in windy weather, which the other species seem much to dislike; nay, even frequenting exposed sea-port towns, and making little excursions over the salt-water. Horsemen on wide downs are often closely

attended by a little party of swallows for miles together, which plays before and behind them, sweeping around, and collecting all the sculking insects that are roused by the trampling of the horses feet: when the wind blows hard, without this expedient, they are often forced to settle to pick up their lurking prey.

This species feeds much on little *coleoptera*, as well as on gnats and flies; and often settles on dug ground, or paths, for gravels to grind and digest its food. Before they depart, for some weeks, to a bird, they forsake houses and chimnies, and roost in trees; and usually withdraw about the beginning of *October*; though some few stragglers may appear on at times till the first week in *November*.

Some few pairs haunt the new and open streets of *London* next the fields, but do not enter, like the house-martin, the close and crowded parts of the city.

Both male and female are distinguished from their congeners by the length and forkedness of their tails. They are un-

doubtedly the most nimble of all the species; and when the male pursues the female in amorous chase, they then go beyond their usual speed, and exert a rapidity almost too quick for the eye to follow.

After this circumstantial detail of the life and discerning στοργὴ of the swallow, I shall add, for your further amusement, an anecdote or two not much in favour of her sagacity:—

A certain swallow built for two years together on the handles of a pair of garden-shears, that were stuck up against the boards in an out-house, and therefore must have her nest spoiled whenever that implement was wanted: and, what is stranger still, another bird of the same species built its nest on the wings and body of an owl that happened by accident to hang dead and dry from the rafter of a barn. This owl, with the nest on its wings, and with eggs in the nest, was brought as a curiosity worthy the most elegant private museum in *Great Britain*. The owner, struck

with the oddity of the sight, furnished the bringer with a large shell, or conch, desiring him to fix it just where the owl hung: the person did as he was ordered, and the following year a pair, probably the same pair, built their nest in the conch, and laid their eggs.

The owl and the conch make a strange grotesque appearance, and are not the least curious specimens in that wonderful collection of art and nature.*

Thus is instinct in animals, taken the least out of its way, an undistinguishing, limited faculty: and blind to every circumstance that does not immediately respect self-preservation, or lead at once to the propagation or support of their species.

I am,

with all respect, &c. &c.

* Sir *Ashton Lever*'s Musæum.

LETTER XIX.

TO THE SAME.

DEAR SIR; SELBORNE, Feb. 14, 1774.

I RECEIVED your favour of the eighth, and am pleased to find that you read my little history of the swallow with your usual candour: nor was I the less pleased to find that you made objections where you saw reason.

As to the quotations, it is difficult to say precisely which species of hirundo *Virgil* might intend in the lines in question, since the ancients did not attend to specific differences like modern naturalists; yet somewhat may be gathered, enough to incline me to suppose that in the two passages quoted, the poet had his eye on the swallow.

In the first place the epithet *garrula* suits

the *swallow* well, who is a great songster; and not the *martin*, which is rather a mute bird; and when it sings is so inward as scarce to be heard. Besides, if *tignum* in that place signifies a *rafter* rather than a *beam*, as it seems to me to do, then I think it must be the *swallow* that is alluded to, and not the *martin*; since the former does frequently build *within the roof* against the *rafters*; while the latter always, as far as I have been able to observe, builds *without the roof* against eaves and cornices.

As to the *simile*, too much stress must not be laid on it; yet the epithet *nigra* speaks plainly in favour of the swallow, whose back and wings are very black; while the rump of the martin is milk-white, its back and wings blue, and all its under part white as snow. Nor can the clumsy motions (comparatively clumsy) of the martin well represent the sudden and artful evolutions and quick turns which *Juturna* gave to her brother's chariot, so as to elude the eager pursuit of the enraged *Æneas*. The

verb *sonat* also seems to imply a bird that is somewhat loquacious.*

We have had a very wet Autumn and Winter, so as to raise the springs to a pitch beyond any thing since 1764; which was a remarkable year for floods and high waters. The land-springs, which we call *levants,* break out much on the downs of *Sussex, Hampshire,* and *Wiltshire.* The country people say when the *levants* rise corn will always be dear; meaning that when the earth is so glutted with water as to send forth springs on the downs and uplands, that the corn vales must be drowned; and so it has proved for these ten or eleven years past. For land-springs have never obtained more since the memory of man than during that period; nor has there been known a greater scarcity of all sorts of grain, considering the great improvements

* "*Nigra* velut magnas domini cum divitis ædes
"Pervolat, et pennis alta atria lustrat hirundo,
"Pabula parva legens, nidisque loquacibus escas:
"Et nunc porticibus vacuis, nunc humida circum
"Stagna *sonat.*"

of modern husbandry. Such a run of wet seasons a century or two ago would, I am persuaded, have occasioned a famine. Therefore pamphlets and newspaper letters, that talk of combinations, tend to inflame and mislead; since we must not expect plenty till Providence sends us more favourable seasons.

The wheat of last year, all round this district, and in the county of *Rutland*, and elsewhere, yields remarkably bad: and our wheat on the ground, by the continual late sudden vicissitudes from fierce frost to pouring rains, looks poorly; and the turnips rot very fast. I am, &c.

LETTER XX.

TO THE SAME.

DEAR SIR; SELBORNE, Feb. 26, 1774.

THE sand-martin, or bank-martin, is by much the least of any of the *British hirun-*

dines; and, as far as we have ever seen, the smallest known hirundo: though *Brisson* asserts that there is one much smaller, and that is the *hirundo esculenta.*

But it is much to be regretted that it is scarce possible for any observer to be so full and exact as he could wish in reciting the circumstances attending the life and conversation of this little bird, since it is *fera naturâ,* at least in this part of the kingdom, disclaiming all domestic attachments, and haunting wild heaths and commons where there are large lakes; while the other species, especially the swallow and house-martin, are remarkably gentle and domesticated, and never seem to think themselves safe but under the protection of man.

Here are in this parish, in the sand-pits and banks of the lakes of *Wolmer-forest,* several colonies of these birds; and yet they are never seen in the village; nor do they at all frequent the cottages that are scattered about in that wild district. The only instance I ever remember where this species haunts any building is at the town of *Bi-*

shop's Waltham, in this county, where many sand-martins nestle and breed in the scaffold holes of the back-wall of *William* of *Wykeham*'s stables: but then this wall stands in a very sequestered and retired enclosure, and faces upon a large and beautiful lake. And indeed this species seems so to delight in large waters, that no instance occurs of their abounding, but near vast pools or rivers: and in particular it has been remarked that they swarm in the banks of the *Thames* in some places below *London-bridge.*

It is curious to observe with what different degrees of architectonic skill Providence has endowed birds of the same genus, and so nearly correspondent in their general mode of life! for while the swallow and the house-martin discover the greatest address in raising and securely fixing crusts or shells of loam as cunabula for their young, the bank-martin terebrates a round and regular hole in the sand or earth, which is serpentine, horizontal, and about two feet deep. At the inner end of this burrow

does this bird deposit, in a good degree of safety, her rude nest, consisting of fine grasses and feathers, usually goose-feathers, very inartificially laid together.

Perseverance will accomplish any thing: though at first one would be disinclined to believe that this weak bird, with her soft and tender bill and claws, should ever be able to bore the stubborn sand-bank without entirely disabling herself; yet with these feeble instruments have I seen a pair of them make great dispatch: and could remark how much they had scooped that day by the fresh sand which ran down the bank, and was of a different colour from that which lay loose and bleached in the sun.

In what space of time these little artists are able to mine and finish these cavities I have never been able to discover, for reasons given above; but it would be a matter worthy of observation, where it falls in the way of any naturalist to make his remarks. This I have often taken notice of, that se-

veral holes of different depths are left unfinished at the end of Summer. To imagine that these beginnings were intentionally made in order to be in the greater forwardness for next Spring, is allowing perhaps too much foresight and *rerum prudentia* to a simple bird. May not the cause of these *latebræ* being left unfinished arise from their meeting in those places with strata too harsh, hard, and solid, for their purpose, which they relinquish, and go to a fresh spot that works more freely? Or may they not in other places fall in with a soil as much too loose and mouldering, liable to founder, and threatening to overwhelm them and their labours?

One thing is remarkable—that, after some years, the old holes are forsaken and new ones bored; perhaps because the old habitations grow foul and fetid from long use, or because they may so abound with fleas, as to become untenantable. This species of swallow moreover is strangely annoyed with fleas: and we have seen fleas,

bed fleas *(pulex irritans)*, swarming at the mouths of these holes, like bees on the stools of their hives.

The following circumstance should by no means be omitted—that these birds do *not* make use of their caverns by way of hybernacula, as might be expected; since banks so perforated have been dug out with care in the Winter, when nothing was found but empty nests.

The sand-martin arrives much about the same time with the swallow, and lays, as she does, from four to six white eggs. But as this species is *cryptogame*, carrying on the business of nidification, incubation, and the support of its young in the dark, it would not be so easy to ascertain the time of breeding, were it not for the coming forth of the broods, which appear much about the time, or rather somewhat earlier than those of the swallow. The nestlings are supported in common like those of their congeners, with gnats and other small insects; and sometimes they are fed with

libellulæ (dragon-flies) almost as long as themselves. In the last week in *June* we have seen a row of these sitting on a rail near a great pool as *perchers;* and so young and helpless, as easily to be taken by hand: but whether the dams ever feed them on the wing, as swallows and house-martins do, we have never yet been able to determine: nor do we know whether they pursue and attack birds of prey.

When they happen to breed near hedges and enclosures, they are dispossessed of their breeding holes by the house-sparrow, which is on the same account a fell adversary to house-martins.

These *hirundines* are no songsters, but rather mute, making only a little harsh noise when a person approaches their nests. They seem not to be of a sociable turn, never with us congregating with their congeners in the Autumn. Undoubtedly they breed a second time, like the house-martin and swallow; and withdraw about *Michaelmas.*

Though in some particular districts they may happen to abound, yet in the whole, in the south of *England* at least, is this much the rarest species. For there are few towns or large villages but what abound with house-martins; few churches, towers or steeples, but what are haunted by some swifts; scarce a hamlet or single cottage-chimney that has not its swallow; while the bank-martins, scattered here and there, live a sequestered life among some abrupt sand-hills, and in the banks of some few rivers.

These birds have a peculiar manner of flying; flitting about with odd jerks, and vacillations, not unlike the motions of a butterfly. Doubtless the flight of all *hirundines* is influenced by, and adapted to, the peculiar sort of insects which furnish their food. Hence it would be worth inquiry to examine what particular genus of insects affords the principal food of each respective species of swallow.

Notwithstanding what has been advanced above, some few sand-martins, I

see, haunt the skirts of *London*, frequenting the dirty pools in *Saint George's-Fields*, and about *White-Chapel*. The question is where these build, since there are no banks or bold shores in that neighbourhood: perhaps they nestle in the scaffold holes of some old or new deserted building. They dip and wash as they fly sometimes, like the house-martin and swallow.

Sand-martins differ from their congeners in the diminutiveness of their size, and in their colour, which is what is usually called a mouse-colour. Near *Valencia* in *Spain*, they are taken, says *Willughby*, and sold in the markets for the table; and are called by the country people, probably from their desultory jerking manner of flight, *Papillon de Montagna*.

LETTER XXI.

TO THE SAME.

DEAR SIR; SELBORNE, Sept. 28, 1774.

As the *swift* or *black-martin* is the largest of the *British hirundines*, so is it undoubtedly the latest comer. For I remember but one instance of its appearing before the last week in *April:* and in some of our late frosty, harsh Springs, it has not been seen till the beginning of *May*. This species usually arrives in pairs.

The swift, like the sand-martin, is very defective in architecture, making no crust, or shell, for its nest: but forming it of dry grasses and feathers, very rudely and inartificially put together. With all my attention to these birds, I have never been able once to discover one in the act of collecting or carrying in materials: so that I have suspected (since their nests are exactly the same) that they sometimes usurp upon the

house-sparrows, and expel them, as sparrows do the house and sand martin; well remembering that I have seen them squabbling together at the entrance of their holes; and the sparrows up in arms, and much disconcerted at these intruders. And yet I am assured by a nice observer in such matters, that they do collect feathers for their nests in *Andalusia;* and that he has shot them with such materials in their mouths.

Swifts, like sand-martins, carry on the business of nidification quite in the dark, in crannies of castles, and towers, and steeples, and upon the tops of the walls of churches under the roof; and therefore cannot be so narrowly watched as those species that build more openly: but, from what I could ever observe, they begin nesting about the middle of *May;* and I have remarked, from eggs taken, that they have sat hard by the ninth of *June.* In general they haunt tall buildings, churches, and steeples, and breed only in such: yet in this village some pairs frequent the lowest and meanest cottages, and educate their young under those

thatched roofs. We remember but one instance where they breed out of buildings; and that is in the sides of a deep chalk-pit near the town of *Odiham*, in this county, where we have seen many pairs entering the crevices, and skimming and squeaking round the precipices.

As I have regarded these amusive birds with no small attention, if I should advance something new and peculiar with respect to them, and different from all other birds, I might perhaps be credited; especially as my assertion is the result of many years exact observation. The fact that I would advance is, that swifts *tread*, or copulate, on the wing: and I would wish any nice observer, that is startled at this supposition, to use his own eyes, and I think he will soon be convinced. In another *class* of animals, *viz.* the *insect*, nothing is so common as to see the different species of many genera in conjunction as they fly. The swift is almost continually on the wing; and as it never settles on the ground, on trees, or roofs, would seldom

find opportunity for amorous rites, was it not enabled to indulge them in the air. If any person would watch these birds of a fine morning in *May*, as they are sailing round at a great height from the ground, he would see, every now and then, one drop on the back of another, and both of them sink down together for many fathoms with a loud piercing shriek. This I take to be the juncture when the business of generation is carrying on.

As the swift eats, drinks, collects materials for its nest, and, as it seems, propagates on the wing : it appears to live more in the air than any other bird, and to perform all functions there save those of sleeping and incubation.

This *hirundo* differs widely from its congeners in laying invariably but *two* eggs at a time, which are milk-white, long, and peaked at the small end; whereas the other species lay at each brood from *four* to *six*. It is a most alert bird, rising very early, and retiring to roost very late ; and is on the wing in the height of Summer at least

sixteen hours. In the longest days it does not withdraw to rest till a quarter before nine in the evening, being the latest of all day birds. Just before they retire, whole groups of them assemble high in the air, and squeak and shoot about with wonderful rapidity. But this bird is never so much alive as in sultry thundry weather, when it expresses great alacrity, and calls forth all its powers. In hot mornings several, getting together in little parties, dash round the steeples and churches, squeaking as they go in a very clamorous manner: these, by nice observers, are supposed to be males serenading their setting hens; and not without reason, since they seldom squeak till they come close to the walls or eaves, and since those within utter at the same time a little inward note of complacency.

When the hen has sat hard all day she rushes forth just as it is almost dark, and stretches and relieves her weary limbs, and snatches a scanty meal for a few minutes, and then returns to her duty of incubation. Swifts, when wantonly and cruelly shot

while they have young, discover a little lump of insects in their mouths, which they pouch and hold under their tongue. In general they feed in a much higher district than the other species: a proof that gnats and other insects do also abound to a considerable height in the air: they also range to vast distances; since loco-motion is no labour to them, who are endowed with such wonderful powers of wing. Their powers seem to be in proportion to their levers; and their wings are longer in proportion than those of almost any other bird. When they mute, or ease themselves in flight, they raise their wings, and make them meet over their backs.

At some certain times in the Summer I had remarked that swifts were hawking very low for hours together over pools and streams; and could not help inquiring into the object of their pursuit that induced them to descend so much below their usual range. After some trouble, I found that they were taking *phryganeæ*, *ephemeræ*, and *libellulæ* (cadew-flies, may-flies, and dragon-

flies) that were just emerged out of their aurelia state. I then no longer wondered that they should be so willing to stoop for a prey that afforded them such plentiful and succulent nourishment.

They bring out their young about the middle or latter end of *July*: but as these never become perchers, nor, that ever I could discern, are fed on the wing by their dams, the coming forth of the young is not so notorious as in the other species.

On the thirtieth of last *June* I untiled the eaves of an house where many pairs build, and found in each nest only *two* squab, naked *pulli*: on the eighth of *July* I repeated the same inquiry, and found they had made very little progress, towards a fledged state, but were still naked and helpless. From whence we may conclude that birds whose way of life keeps them perpetually on the wing would not be able to quit their nest till the end of the month. Swallows and martins, that have numerous families, are continually feeding them every two or three minutes; while swifts, that

have but two young to maintain, are much at their leisure, and do not attend on their nests for hours together.

Sometimes they pursue and strike at hawks that come in their way; but not with that vehemence and fury that swallows express on the same occasion. They are out all day long in wet days, feeding about and disregarding still rain: from whence two things may be gathered; first, that many insects abide high in the air, even in rain; and next, that the feathers of these birds must be well preened to resist so much wet. Windy, and particularly windy weather with heavy showers, they dislike, and on such days withdraw, and are scarce ever seen.

There is a circumstance respecting the *colour* of swifts, which seems not to be unworthy our attention. When they arrive in the Spring they are all over of a glossy, dark soot colour, except their chins, which are white; but by being all day long in the sun and air, they become quite weather-beaten and bleached before they depart, and

yet they return glossy again in the Spring. Now, if they pursue the sun into lower latitudes, as some suppose, in order to enjoy a perpetual Summer, why do they not return bleached? Do they not rather perhaps retire to rest for a season, and at that juncture moult and change their feathers, since all other birds are known to moult soon after the season of breeding.

Swifts are very anomalous in many particulars, dissenting from all their congeners not only in the number of their young, but in breeding but *once* in a Summer; whereas all the other *British hirundines* breed invariably *twice*. It is past all doubt that swifts can breed but once, since they withdraw in a short time after the flight of their young, and some time before their congeners bring out their second broods. We may here remark, that as swifts breed but *once* in a Summer, and only *two* at a time, and the other *hirundines twice*, the latter, who lay from four to six eggs, increase at an average five times as fast as the former.

But in nothing are swifts more singular than in their early retreat. They retire, as to the main body of them, by the tenth of *August*, and sometimes a few days sooner: and every straggler invariably withdraws by the twentieth, while their congeners, all of them, stay till the beginning of *October;* many of them all through that month, and some occasionally to the beginning of *November*. This early retreat is mysterious and wonderful, since that time is often the sweetest season in the year. But, what is more extraordinary, they begin to retire still earlier in the most southerly parts of *Andalusia*, where they can be no ways influenced by any defect of heat; or, as one might suppose, defect of food. Are they regulated in their motions with us by a failure of food, or by a propensity to moulting, or by a disposition to rest after so rapid a life, or by what? This is one of those incidents in natural history that not only baffles our searches, but almost eludes our guesses!

These hirundines never perch on trees or roofs, and so never congregate with their congeners. They are fearless while haunting their nesting places, and are not to be scared with a gun; and are often beaten down with poles and cudgels as they stoop to go under the eaves. Swifts are much infested with those pests to the genus called *hippoboscæ hirundinis;* and often wriggle and scratch themselves, in their flight, to get rid of that clinging annoyance.

Swifts are no songsters, and have only one harsh screaming note: yet there are ears to which it is not displeasing, from an agreeable association of ideas, since that note never occurs but in the most lovely Summer weather.

They never settle on the ground but through accident; and when down can hardly rise, on account of the shortness of their legs and the length of their wings: neither can they walk, but only crawl; but they have a strong grasp with their feet, by which they cling to walls. Their bodies being flat they can enter a very narrow

crevice; and where they cannot pass on their bellies they will turn up edgewise.

The particular formation of the foot discriminates the swift from all the *British hirundines;* and indeed from all other known birds, the *hirundo melba,* or great white-bellied swift of *Gibraltar,* excepted; for it is so disposed as to carry "*omnes quatuor digitos anticos,*" all its four toes forward; besides the least toe, which should be the back-toe, consists of one bone alone, and the other three only of two apiece. A construction most rare and peculiar, but nicely adapted to the purposes in which their feet are employed. This, and some peculiarities attending the nostrils and under mandible, have induced a discerning naturalist* to suppose that this *species* might constitute a *genus per se.*

In *London* a party of swifts frequents the *Tower,* playing and feeding over the river just below the bridge: others haunt some of the churches of the *Borough* next the fields; but do not venture, like the *house-*

* John Antony Scopoli, of Carniola, M. D.

martin, into the close crowded part of the town.

The *Swedes* have bestowed a very pertinent name on this swallow, calling it *ring-swala,* from the perpetual *rings* or circles that it takes round the scene of its nidification.

Swifts feed on *coleoptera,* or small beetles with hard cases over their wings, as well as on the softer insects; but it does not appear how they can procure gravel to grind their food, as swallows do, since they never settle on the ground. Young ones, over-run with *hippoboscæ,* are sometimes found, under their nests, fallen to the ground; the number of vermin rendering their abode insupportable any longer. They frequent in this village several abject cottages: yet a succession still haunts the same unlikely roofs: a good proof this that the same birds return to the same spots. As they must stoop very low to get up under these humble eaves, cats lie in wait, and sometimes catch them on the wing.

On the fifth of *July,* 1775, I again un-

tiled part of a roof over the nest of a swift. The dam sat in the nest; but so strongly was she affected by natural στοργὴ for her brood, which she supposed to be in danger, that, regardless of her own safety, she would not stir, but lay sullenly by them, permitting herself to be taken in hand. The squab young we brought down and placed on the grass-plot. Where they tumbled about, and were as helpless as a new-born child. While we contemplated their naked bodies, their unwieldy disproportioned abdomina, and their heads, too heavy for their necks to support, we could not but wonder when we reflected that these shiftless beings in a little more than a fortnight would be able to dash through the air almost with the inconceivable swiftness of a meteor; and, perhaps, in their emigration, must traverse vast continents and oceans as distant as the equator. So soon does Nature advance small birds to their ἡλικία, or state of perfection; while the progressive growth of men and large quadrupeds is slow and tedious! I am, &c.

LETTER XXII.

TO THE SAME.

DEAR SIR; SELBORNE, Sept. 13, 1774.

By means of a straight cottage-chimney I had an opportunity this Summer of remarking, at my leisure, how swallows ascend and descend through the shaft; but my pleasure in contemplating the address with which this feat was performed to a considerable depth in the chimney, was somewhat interrupted by apprehensions lest my eyes might undergo the same fate with those of *Tobit*.*

Perhaps it may be some amusement to you to hear at what times the different species of hirundines arrived this Spring in three very distant counties of this kingdom. With us the swallow was seen first on *April*

* Tobit ii. 10.

the 4th, the swift on *April* the 24th, the bank-martin on *April* the 12th, and the house-martin not till *April* the 30th. At *South Zele, Devonshire,* swallows did not arrive till *April* the 25th; swifts, in plenty, on *May* the 1st; and house-martins not till the middle of *May.* At *Blackburn* in *Lancashire,* swifts were seen *April* the 28th, swallows *April* the 29th, house-martins, *May* the 1st. Do these different dates in such distant districts, prove any thing for or against migration ?

A farmer, near *Weyhill,* fallows his land with two teams of asses; one of which works till noon, and the other in the afternoon. When these animals have done their work, they are penned all night, like sheep, on the fallow. In the Winter they are confined and foddered in a yard, and make plenty of dung.

Linnæus says, that hawks "*paciscuntur inducias cum avibus, quamdiu cuculus cuculat :*" but it appears to me that, during that period, many little birds are taken and destroyed by birds of prey, as may be seen

by their feathers left in lanes and under hedges.

The *missel-thrush* is, while breeding, fierce and pugnacious, driving such birds as approach its nest, with great fury, to a distance. The *Welch* call it *pen y llwyn*, the head or master of the coppice. He suffers no magpie, jay, or blackbird, to enter the garden where he haunts; and is, for the time, a good guard to the new-sown legumens. In general he is very successful in the defence of his family: but once I observed in my garden, that several magpies came determined to storm the nest of a missel-thrush: the dams defended their mansion with great vigour, and fought resolutely *pro aris & focis;* but numbers at last prevailed, they tore the nest to pieces, and swallowed the young alive.

In the season of nidification the wildest birds are comparatively tame. Thus the *ring-dove* breeds in my fields, though they are continually frequented; and the missel-thrush, though most shy and wild in the Autumn and Winter, builds in my garden

close to a walk where people are passing all day long.

Wall-fruit abounds with me this year; but my grapes, that used to be forward and good, are at present backward beyond all precedent: and this is not the worst of the story; for the same ungenial weather, the same black cold solstice, has injured the more necessary fruits of the earth, and discoloured and blighted our wheat. The crop of hops promises to be very large.

Frequent returns of deafness incommode me sadly, and half disqualify me for a naturalist; for, when those fits are upon me I lose all the pleasing notice and little intimations arising from rural sounds; and *May* is to me as silent and mute with respect to the notes of birds, &c. as *August*. My eyesight is, thank God, quick and good; but with respect to the other sense, I am, at times, disabled:

"And Wisdom at one entrance quite shut out."

LETTER XXIII.

TO THE SAME.

DEAR SIR; SELBORNE, June 8, 1775.

ON *September* the 21st, 1741, being then on a visit, and intent on field-diversions, I rose before day-break: when I came into the enclosures, I found the stubbles and clover-grounds matted all over with a thick coat of cobweb, in the meshes of which a copious and heavy dew hung so plentifully that the whole face of the country seemed, as it were, covered with two or three setting-nets drawn one over another. When the dogs attempted to hunt, their eyes were so blinded and hoodwinked that they could not proceed, but were obliged to lie down and scrape the incumbrances from their faces with their fore feet, so that, finding my sport interrupted, I returned home

musing in my mind on the oddness of the occurrence.

As the morning advanced the sun became bright and warm, and the day turned out one of those most lovely ones which no season but the Autumn produces; cloudless, calm, serene, and worthy of the South of *France* itself.

About nine an appearance very unusual began to demand our attention, a shower of cobwebs falling from very elevated regions, and continuing, without any interruption till the close of the day. These webs were not single filmy threads, floating in the air in all directions, but perfect flakes or rags; some near an inch broad, and five or six long, which fell with a degree of velocity, that showed they were considerably heavier than the atmosphere.

On every side as the observer turned his eyes he might behold a continual succession of fresh flakes falling into his sight, and twinkling like stars as they turned their sides towards the sun.

How far this wonderful shower extended would be difficult to say: but we know that it reached *Bradley, Selborne,* and *Alresford,* three places which lie in a sort of a triangle, the shortest of whose sides is about eight miles in extent.

At the second of those places there was a gentleman (for whose veracity and intelligent turn we have the greatest veneration) who observed it the moment he got abroad; but concluded that, as soon as he came upon the hill above his house, where he took his morning rides, he should be higher than this meteor, which he imagined might have been blown, like *Thistle-down,* from the common above: but, to his great astonishment, when he rode to the most elevated part of the down, 300 feet above his fields, he found the webs in appearance still as much above him as before; still descending into sight in a constant succession, and twinkling in the sun, so as to draw the attention of the most incurious.

Neither before nor after was any such fall observed; but on this day the flakes

hung in the trees and hedges so thick, that a diligent person sent out might have gathered baskets full.

The remark that I shall make on these cobweb-like appearances, called *gossamer*, is, that, strange and superstitious as the notions about them were formerly, nobody in these days doubts but that they are the real production of small spiders, which swarm in the fields in fine weather in Autumn, and have a power of shooting out webs from their tails so as to render themselves buoyant, and lighter than air. But why these apterous insects should *that day* take such a wonderful aërial excursion, and why their webs should at once become so gross and material as to be considerably more weighty than air, and to descend with precipitation, is a matter beyond my skill. If I might be allowed to hazard a supposition, I should imagine that those filmy threads, when first shot, might be entangled in the rising dew, and so drawn up, spiders and all, by a brisk evaporation into the regions where clouds are formed : and

if the spiders have a power of coiling and thickening their webs in the air, as Dr. *Lister* says they have [see his Letters to Mr. *Ray*], then, when they were become heavier than the air, they must fall.

Every day in fine weather, in Autumn chiefly, do I see those spiders shooting out their webs and mounting aloft: they will go off from your finger if you will take them into your hand. Last Summer one alighted on my book as I was reading in the parlour; and, running to the top of the page, and shooting out a web, took its departure from thence. But what I most wondered at was, that it went off with considerable velocity in a place where no air was stirring; and I am sure that I did not assist it with my breath. So that these little crawlers seem to have, while mounting, some loco-motive power without the use of wings, and to move in the air faster than the air itself.

LETTER XXIV.

TO THE SAME.

DEAR SIR; SELBORNE, Aug. 15, 1775.

THERE is a wonderful spirit of sociality in the brute creation, independent of sexual attachment: the congregating of gregarious birds in the Winter is a remarkable instance.

Many horses, though quiet with company, will not stay one minute in a field by themselves: the strongest fences cannot restrain them. My neighbour's horse will not only not stay by himself abroad, but he will not bear to be left alone in a strange stable without discovering the utmost impatience, and endeavouring to break the rack and manger with his fore feet. He has been known to leap out at a stable-window, through which dung was thrown, after company; and yet in other respects is

remarkably quiet. Oxen and cows will not fatten by themselves; but will neglect the finest pasture that is not recommended by society. It would be needless to instance in sheep, which constantly flock together.

But this propensity seems not to be confined to animals of the same species; for we know a doe, still alive, that was brought up from a little fawn with a dairy of cows; with them it goes a-field, and with them it returns to the yard. The dogs of the house take no notice of this deer, being used to her; but, if strange dogs come by, a chase ensues; while the master smiles to see his favourite securely leading her pursuers over hedge, or gate, or stile, till she returns to the cows, who, with fierce lowings and menacing horns, drive the assailants quite out of the pasture.

Even great disparity of kind and size does not always prevent social advances and mutual fellowship. For a very intelligent and observant person has assured me that in the former part of his life, keeping but one horse, he happened also on a time

to have but one solitary hen. These two incongruous animals spent much of their time together in a lonely orchard, where they saw no creature but each other. By degrees an apparent regard began to take place between these two sequestered individuals. The fowl would approach the quadruped with notes of complacency, rubbing herself gently against his legs; while the horse would look down with satisfaction, and move with the greatest caution and circumspection, lest he should trample on his diminutive companion. Thus by mutual good offices, each seemed to console the vacant hours of the other: so that *Milton* when he puts the following sentiment in the mouth of *Adam*, seems to be somewhat mistaken:

"Much less can *bird* with *beast*, or fish with fowl,
"So well converse, nor with the ox the ape."

I am, &c.

LETTER XXV.

TO THE SAME.

DEAR SIR; SELBORNE, Oct. 2, 1775.

WE have two gangs or hordes of gypsies which infest the south and west of *England*, and come round in their circuit two or three times in the year. One of these tribes calls itself by the noble name of *Stanley*, of which I have nothing particular to say; but the other is distinguished by an appellative somewhat remarkable—As far as their harsh gibberish can be understood, they seem to say that the name of their clan is *Curleople;* now the termination of this word is apparently *Grecian:* and as *Mezeray* and the gravest historians all agree that these vagrants did certainly migrate from *Egypt* and the East, two or three centuries ago, and so spread by degrees over *Europe*, may not this family-name, a

little corrupted, be the very name they brought with them from the *Levant?* It would be matter of some curiosity, could one meet with an intelligent person among them, to inquire whether, in their jargon, they still retain any *Greek* words: the *Greek* radicals will appear in hand, foot, head, water, earth, &c. It is possible that amidst their cant and corrupted dialect many mutilated remains of their native language might still be discovered.

With regard to those peculiar people, the gypsies, one thing is very remarkable, and especially as they came from warmer climates; and that is, that while other beggars lodge in barns, stables, and cow-houses, these sturdy savages seem to pride themselves in braving the severities of Winter, and in living *sub dio* the whole year round. Last *September* was as wet a month as ever was known; and yet during those deluges did a young gypsy-girl lie in in the midst of one of our hop-gardens, on the cold ground, with nothing over her but a piece of a blanket extended on a few

hazel rods bent hoop fashion, and stuck into the earth at each end, in circumstances too trying for a cow in the same condition: yet within this garden there was a large hop-kiln, into the chambers of which she might have retired had she thought shelter an object worthy her attention.

Europe itself, it seems, cannot set bounds to the rovings of these vagabonds; for Mr. *Bell*, in his return from *Peking*, met a gang of these people on the confines of *Tartary*, who were endeavouring to penetrate those deserts and try their fortune in *China*.*

Gypsies are called in *French*, *Bohemians*, in *Italian* and modern *Greek*, *Zingani*.

I am, &c.

* See Bell's Travels in China.

LETTER XXVI.

TO THE SAME.

DEAR SIR ; SELBORNE, Nov. 1, 1775.

" Hîc —— tædæ pingues, hic plurimus ignis
" Semper, et assiduâ postes fuligine nigri."

I SHALL make no apology for troubling you with the detail of a very simple piece of domestic œconomy, being satisfied that you think nothing beneath your attention that tends to utility : the matter alluded to is the use of *rushes* instead of candles, which I am well aware prevails in many districts besides this ; but as I know there are countries also where it does not obtain, and as I have considered the subject with some degree of exactness, I shall proceed in my humble story, and leave you to judge of the expediency.

The proper species of *rush* for this purpose seems to be the *juncus conglomeratus,*

or common soft rush, which is to be found in most moist pastures, by the sides of streams, and under hedges. These rushes are in best condition in the height of Summer; but may be gathered, so as to serve the purpose well, quite on to Autumn. It would be needless to add that the largest and longest are best. Decayed labourers, women, and children, make it their business to procure and prepare them. As soon as they are cut they must be flung into water, and kept there; for otherwise they will dry and shrink, and the peel will not run. At first a person would find it no easy matter to divest a rush of its peel or rind, so as to leave one regular, narrow, even rib from top to bottom that may support the pith: but this, like other feats, soon becomes familiar even to children; and we have seen an old woman stone-blind, performing this business with great dispatch, and seldom failing to strip them with the nicest regularity. When these *junci* are thus far prepared, they must lie out on the grass to be bleached, and take

the dew for some nights, and afterwards be dried in the sun.

Some address is required in dipping these rushes in the scalding fat or grease; but this knack also is to be attained by practice. The careful wife of an industrious *Hampshire* labourer obtains all her fat for nothing; for she saves the scummings of her bacon-pot for this use; and if the grease abounds with salt, she causes the salt to precipitate to the bottom, by setting the scummings in a warm oven. Where hogs are not much in use, and especially by the sea-side, the coarser animal-oils will come very cheap. A pound of common grease may be procured for four pence; and about six pounds of grease will dip a pound of rushes; and one pound of rushes may be bought for one shilling; so that a pound of rushes, medicated and ready for use, will cost three shillings. If men that keep bees will mix a little wax with the grease, it will give it a consistency, and render it more cleanly and make the rushes burn longer: mutton-suet would have the same effect.

A good rush, which measured in length two feet four inches and an half, being minuted, burnt only three minutes short of an hour: and a rush of still greater length has been known to burn one hour and a quarter.

These rushes give a good clear light. Watch-lights (coated with tallow), it is true, shed a dismal one, "darkness visible;" but then the wicks of those have *two* ribs of the rind, or peel, to support the pith, while the wick of the dipped rush has but *one*. The *two* ribs are intended to impede the progress of the flame and make the candle last.

In a pound of dry rushes, avoirdupois, which I caused to be weighed and numbered, we found upwards of one thousand six hundred individuals. Now, suppose each of these burns, one with another, only half an hour, then a poor man will purchase eight hundred hours of light, a time exceeding thirty-three entire days, for three shillings. According to this account each rush, before dipping, costs $\frac{1}{533}$ of a farthing.

and $\frac{1}{11}$ afterwards. Thus a poor family will enjoy 5½ hours of comfortable light for a farthing. An experienced old housekeeper assures me that one pound and an half of rushes completely supplies his family the year round, since working people burn no candle in the long days, because they rise and go to bed by daylight.

Little farmers use rushes much in the short days, both morning and evening, in the dairy and kitchen; but the very poor, who are always the worst œconomists, and therefore must continue very poor, buy an halfpenny candle every evening, which, in their blowing open rooms, does not burn much more than two hours. Thus have they only two hours light for their money instead of eleven.

While on the subject of rural œconomy, it may not be improper to mention a pretty implement of housewifery that we have seen no where else; that is, little neat besoms which our foresters make from the stalk of the *polytricum commune*, or *great golden maiden-hair*, which they call *silk-*

wood, and find plenty in the bogs. When this moss is well-combed and dressed, and divested of its outer skin, it becomes of a beautiful bright-chesnut colour; and, being soft and pliant, is very proper for the dusting of beds, curtains, carpets, hangings, &c. If these besoms were known to the brush-makers in town, it is probable they might come much in use for the purpose above-mentioned.* I am, &c.

LETTER XXVII.

TO THE SAME.

DEAR SIR; SELBORNE, Dec. 12, 1775.

WE had in this village more than twenty years ago an idiot-boy, whom I well remember, who, from a child, showed a strong propensity to bees; they were his food, his

* A besom of this sort is to be seen in Sir *Ashton Lever's* Museum.

amusement, his sole object. And as people of this cast have seldom more than one point in view, so this lad exerted all his few faculties on this one pursuit. In the Winter he dosed away his time, within his father's house, by the fire-side, in a kind of torpid state, seldom departing from the chimney-corner; but in the Summer he was all alert, and in quest of his game in the fields, and on sunny-banks. Honey-bees, humble-bees, and wasps, were his prey wherever he found them: he had no apprehensions from their stings, but would seize them *nudis manibus*, and at once disarm them of their weapons, and suck their bodies for the sake of their honey-bags. Sometimes he would fill his bosom between his shirt and his skin with a number of these captives: and sometimes would confine them in bottles. He was a very *merops apiaster*, or *bee-bird*; and very injurious to men that kept bees; for he would slide into their bee-gardens, and, sitting down before the stools, would rap with his finger on the hives, and so take the bees as they

came out. He has been known to overturn hives for the sake of honey, of which he was passionately fond. Where metheglin was making he would linger round the tubs and vessels, begging a draught of what he called *bee-wine*. As he ran about he used to make a humming noise with his lips, resembling the buzzing of bees. This lad was lean and sallow, and of a cadaverous complexion; and, except in his favourite pursuit, in which he was wonderfully adroit, discovered no manner of understanding. Had his capacity been better, and directed to the same object, he had perhaps abated much of our wonder at the feats of a more modern exhibiter of bees; and we may justly say of him now,

"———————————— Thou,
" Had thy presiding star propitious shone,
" Should'st *Wildman* be ————————."

When a tall youth he was removed from hence to a distant village, where he died, as I understand, before he arrived at manhood. I am, &c

LETTER XXVIII.

TO THE SAME.

DEAR SIR; SELBORNE, Jan. 8, 1776.

IT is the hardest thing in the world to shake off superstitious prejudices: they are sucked in as it were with our mother's milk; and, growing up with us at a time when they take the fastest hold and make the most lasting impressions, become so interwoven into our very constitutions, that the strongest good sense is required to disengage ourselves from them. No wonder therefore that the lower people retain them their whole lives through, since their minds are not invigorated by a liberal education, and therefore not enabled to make any efforts adequate to the occasion.

Such a preamble seems to be necessary before we enter on the superstitions of this district, lest we should be suspected of

exaggeration in a recital of practices too gross for this enlightened age.

But the people of *Tring*, in *Hertfordshire*, would do well to remember, that no longer ago than the year 1751, and within twenty miles of the capital, they seized on two superannuated wretches, crazed with age, and overwhelmed with infirmities, on a suspicion of witchcraft; and, by trying experiments, drowned them in a horse-pond.

In a farm-yard near the middle of this village stands, at this day, a row of pollard-ashes, which, by the seams and long cicatrices down their sides, manifestly show that, in former times, they have been cleft asunder. These trees, when young and flexible, were severed and held open by wedges, while ruptured children, stripped naked were pushed through the apertures, under a persuasion that, by such a process, the poor babes would be cured of their infirmity. As soon as the operation was over, the tree in the suffering part was plastered with loam, and carefully swathed up. If the parts coalesced and soldered together,

as usually fell out, where the feat was performed with any adroitness at all, the party was cured; but where the cleft continued to gape, the operation, it was supposed, would prove ineffectual. Having occasion to enlarge my garden not long since, I cut down two or three such trees, one of which did not grow together.

We have several persons now living in the village, who, in their childhood, were supposed to be healed by this superstitious ceremony, derived down, perhaps, from our Saxon ancestors, who practised it before their conversion to Christianity.

At the south corner of the *Plestor*, or area, near the church, there stood, about twenty years ago, a very old grotesque hollow pollard-ash, which for ages had been looked on with no small veneration as a *shrew-ash*. Now a shrew-ash is an ash whose twigs or branches, when gently applied to the limbs of cattle, will immediately relieve the pains which a beast suffers from the running of a *shrew-mouse* over the part affected: for it is supposed that a

shrew-mouse is of so baneful and deleterious a nature, that wherever it creeps over a beast, be it horse, cow, or sheep, the suffering animal is afflicted with cruel anguish, and threatened with the loss of the use of the limb. Against this accident, to which they were continually liable, our provident fore-fathers always kept a shrew-ash at hand, which, when once medicated, would maintain its virtue for ever. A shrew-ash was made thus:*—Into the body of the tree a deep hole was bored with an auger, and a poor devoted shrew-mouse was thrust in alive, and plugged in, no doubt, with several quaint incantations long since forgotten. As the ceremonies necessary for such a consecration are no longer understood, all succession is at an end, and no such tree is known to subsist in the manor or hundred.

As to that on the *Plestor,*

"The late vicar stubb'd and burnt it."

when he was way-warden, regardless of

* For a similar practice, see *Plot's Staffordshire.*

the remonstrances of the by-standers, who interceded in vain for its preservation, urging its power and efficacy and alleging that it had been

"Religione patrum multos servata per annos."

I am, &c.

LETTER XXIX.

TO THE SAME.

DEAR SIR; SELBORNE, Feb. 7, 1776.

In heavy fogs, on elevated situations especially, trees are perfect alembics: and no one that has not attended to such matters can imagine how much water one tree will distil in a night's time, by condensing the vapour, which trickles down the twigs and boughs, so as to make the ground below quite in a float. In *Newton-lane*, in *October*, 1775, on a misty day, a particular oak in leaf dropped so fast that the cart-way stood in puddles and the ruts ran with water, though the ground in general was dusty.

In some of our smaller islands in the *West-Indies*, if I mistake not, there are no springs or rivers: but the people are supplied with that necessary element, water, merely by the dripping of some large tall trees, which, standing in the bosom of a mountain, keep their heads constantly enveloped with fogs and clouds, from which they dispense their kindly never-ceasing moisture; and so render those districts habitable by condensation alone.

Trees in leaf have such a vast proportion more of surface than those that are naked, that, in theory, their condensations should greatly exceed those that are stripped of their leaves: but, as the former *imbibe* also a great quantity of moisture, it is difficult to say which drip most: but this I know, that deciduous trees that are entwined with much ivy seem to distil the greatest quantity. Ivy leaves are smooth, and thick and cold, and therefore condense very fast; and besides ever-greens imbibe very little. These facts may furnish the intelligent with hints concerning what sorts of trees they

should plant round small ponds that they would wish to be perennial: and show them how advantageous some trees are in preference to others.

Trees perspire profusely, condense largely, and check evaporation so much, that woods are always moist: no wonder therefore that they contribute much to pools and streams.

That trees are great promoters of lakes and rivers appears from a well-known fact in *North-America;* for, since the woods and forests have been grubbed and cleared, all bodies of water are much diminished; so that some streams, that were very considerable a century ago, will not now drive a common mill.* Besides, most woodlands, forests, and chases, with us abound with pools and morasses; no doubt for the reason given above.

To a thinking mind few phenomena are more strange than the state of little ponds on the summits of chalk-hills, many of which are never dry in the most trying

* Vide *Kalm*'s Travels to *North-America*.

droughts of Summer. On *chalk-hills* I say, because in many rocky and gravelly soils springs usually break out pretty high on the sides of elevated grounds and mountains; but no person acquainted with chalky districts will allow that they ever saw springs in such a soil but in vallies and bottoms, since the waters of so pervious a stratum as chalk all lie on one dead level, as well-diggers have assured me again and again.

Now we have many such little round ponds in this district; and one in particular on our sheep-down, three hundred feet above my house; which though never above three feet deep in the middle, and not more than thirty feet in diameter, and containing perhaps not more than two or three hundred hogsheads of water, yet never is known to fail, though it affords drink for three hundred or four hundred sheep, and for at least twenty head of large cattle beside. This pond, it is true, is overhung with two moderate beeches, that, doubtless, at times, afford it much supply;

but then we have others as small, that, without the aid of trees, and in spite of evaporation from sun and wind, and perpetual consumption by cattle, yet constantly maintain a moderate share of water, without overflowing in the wettest seasons, as they would do if supplied by springs. By my journal of *May* 1775, it appears that " the " small and even considerable ponds in the " vales are now dried up, while the small " ponds on the very tops of hills are but " little affected." Can this difference be accounted for from evaporation alone, which certainly is more prevalent in bottoms? or rather have not those elevated pools some unnoticed recruits, which in the night time counterbalance the waste of the day; without which the cattle alone must soon exhaust them? And here it will be necessary to enter more minutely into the cause. Dr. *Hales*, in his vegetable Statics, advances, from experiment, that " the moister the " earth is, the more dew falls on it in a " night: and more than a *double* quantity " of dew falls on a surface of *water* than

" there does on an equal surface of moist " earth." Hence we see that water, by its coolness, is enabled to assimilate to itself a large quantity of moisture nightly by condensation: and that the air, when loaded with fogs and vapours, and even with copious dews, can alone advance a considerable and never-failing resource. Persons that are much abroad, and travel early and late, such as shepherds, fishermen, &c. can tell what prodigious fogs prevail in the night on elevated downs, even in the hottest parts of Summer; and how much the surfaces of things are drenched by those swimming vapours, though, to the senses, all the while, little moisture seems to fall.

I am, &c.

END OF VOL. I.

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